

AD-A257 243



Research Product 92-09

DTIC
ELECTE
OCT 27 1992
S C D

Multiple-Station Range Target System Operations Manual

419420
92-28055



111 pgs
September 1992

Fort Bliss Field Unit
Training Systems Research Division

U.S. Army Research Institute for the Behavioral and Social Sciences

Approved for public release; distribution is unlimited.

U.S. ARMY RESEARCH INSTITUTE FOR THE BEHAVIORAL AND SOCIAL SCIENCES

A Field Operating Agency Under the Jurisdiction
of the Deputy Chief of Staff for Personnel

EDGAR M. JOHNSON
Technical Director

MICHAEL D. SHALER
COL, AR
Commanding

Research accomplished under contract
for the Department of the Army

Science Applications International Corp.

Technical review by

Major Danny H. Davis
Donald B. Headley

Association For	
NTIS GRA&I	☒
DTIC TAB	☐
Unannounced	☐
Justification	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

DTIC 2011-10-10 1

NOTICES

FINAL DISPOSITION: This Research Product may be destroyed when it is no longer needed.
Please do not return it to the U.S. Army Research Institute for the Behavioral and Social Sciences.

NOTE: This Research Product is not to be construed as an official Department of the Army
position, unless so designated by other authorized documents.

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE 1992, September		3. REPORT TYPE AND DATES COVERED Final Aug 90 - Aug 92	
4. TITLE AND SUBTITLE Multiple-Station Range Target System Operations Manual				5. FUNDING NUMBERS MDA903-85-C-0460 63007A 793 1201 C01	
6. AUTHOR(S) Berry, Gene (SAIC)					
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Science Applications International Corp. 5959 Gateway West, Suite 542 El Paso, TX 79925				8. PERFORMING ORGANIZATION REPORT NUMBER 01-0426-07-0681-090-1	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army Research Institute for the Behavioral and Social Sciences ATTN: PERI-IB 5001 Eisenhower Avenue Alexandria, VA 22333-5600				10. SPONSORING/MONITORING AGENCY REPORT NUMBER ARI Research Product 92-09	
11. SUPPLEMENTARY NOTES Contracting Officer's Representative, John M. Lockhart					
12a. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.				12b. DISTRIBUTION CODE --	
13. ABSTRACT (Maximum 200 words) The Multiple-Station Range Target System (RTS) is a high-fidelity engagement simulator. Short Range Air Defense (SHORAD) and Forward Area Air Defense System (FAADS) crews employ their actual weapons in simulated or live-fire engagement of subscale, fixed-wing and rotary-wing aircraft. RTS permits training and evaluation of individuals, crews, and platoons; provides detailed crew performance scoring and feedback; and can be moved from one location to another and rapidly deployed for a new training exercise or test application. This operations manual describes the major RTS components (targets, range control station, data acquisition station, position-location station, and laser ballistics simulator); RTS set-up procedures; RTS system preparation and installation procedures; and RTS operations, maintenance, and supply. Two separately published annexes to this manual exist. Annex 1 describes the Pop-Up Target System operations and maintenance. Annex 2 describes the Flying Target System operations and maintenance. These three manuals contain the minimum documentation needed to support RTS.					
14. SUBJECT TERMS Short Range Air Defense (SHORAD) Engagement simulation FAAD				15. NUMBER OF PAGES 109	
				16. PRICE CODE --	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified		20. LIMITATION OF ABSTRACT Unlimited	

Research Product 92-09

Multiple-Station Range Target System Operations Manual

Gene Berry
Science Applications International Corp.

Field Unit at Fort Bliss, Texas
Michael H. Strub, Chief

Training Systems Research Division
Jack H. Hiller, Director

U.S. Army Research Institute for the Behavioral and Social Sciences
5001 Eisenhower Avenue, Alexandria, Virginia 22333-5600

Office, Deputy Chief of Staff for Personnel
Department of the Army

September 1992

Army Project Number
2Q263007A793

**Human Factors in Training and
Operational Effectiveness**

Approved for public release; distribution is unlimited.

FOREWORD

The Soldier-System Effectiveness Team of the Fort Bliss Field Unit of the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) performs research and development in human performance issues relevant to improving Army Air Defense effectiveness.

Currently, the team is completing a research task entitled "Forward Area Air Defense (FAAD) Performance During Engagement Operations in a Chemical Environment." The research is funded by the Physiological and Psychological Effects of the Nuclear, Biological, and Chemical Environment and Sustained Operations on Systems in Combat (P²NBC²) Office, U.S. Army Chemical School, Fort McClellan. The proponent agency for this research is the Directorate of Combat Developments at the U.S. Army Air Defense Artillery School (USAADASCH) at Fort Bliss. A Memorandum of Agreement covering this research project was signed on 7 November 1991 by USAADASCH and ARI.

The research program uses the Multiple-Station Range Target System (RTS) as a testbed. The Multiple-Station RTS is a cost-effective modification of the RTS described in ARI Research Products 91-01, 91-02, and 91-03. Short Range Air Defense (SHORAD) and Forward Area Air Defense System (FAADS) crews employ their actual weapons or training devices in simulated or live-fire engagement of subscale, fixed-wing and rotary-wing aircraft in the RTS high-fidelity engagement simulator.

This Research Product is an operations manual for the Multiple-Station RTS and describes the major RTS components, set-up procedures, system preparation and installation procedures, operations, and maintenance and supply requirements.

The RTS has utility as a research testbed and as an Air Defense doctrine and training evaluation bed.



EDGAR M. JOHNSON
Technical Director

MULTIPLE-STATION RANGE TARGET SYSTEM OPERATIONS MANUAL

CONTENTS

	Page
INTRODUCTION	1
Manual Format	1
System Description	2
Feedback	3
Major RTS Components	4
RTS Procedures Overview	12
RTS SETUP	15
Maintain Support Files	16
View RTS Fixed Parameters	20
Maintain Scenarios	21
Maintain Positions	23
RTS Tools	26
SYSTEM PREPARATION AND INSTALLATION	29
Selecting a Site	29
Unpacking the RTS	31
System Cabling	32
System Startup and Shutdown	36
System Registration	38
RANGE TARGET SYSTEM (RTS) OPERATIONS	41
Software Overview	41
Menu Examples	43
Range Control Station (RCS) Operations	47
Data Acquisition Station (DAS) Operations	66
Position-Location Station (PLS) Operations	80
Laser Ballistics Simulator (LBS) Operations	86
Pop-up Target System (PTS) Operations	86
Flying Target System (FTS) Operations	86
Post-Processing Operations	87
MAINTENANCE AND SUPPLY	91
Maintenance Support	91

CONTENTS (Continued)

	Page
RELATED USER DOCUMENTATION	91
Field Manuals	91
Technical Manuals	92
Miscellaneous Publications (Hardware)	92
Miscellaneous Publications (Software)	93
Miscellaneous References	94
Nomenclature Cross-Reference	94
REFERENCES	95
LIST OF ABBREVIATIONS AND ACRONYMS	95
GLOSSARY	97

LIST OF TABLES

Table 1. List of Procedures in RTS Operations	14
---	----

LIST OF FIGURES

Figure 1. RTS configuration	5
2. Flying Target System	7
3. Pop-up Target System	8
4. Range Control Station	9
5. Data Acquisition Station	10
6. Position-Location Station	11
7. Laser Ballistics Simulator	13
8. RTS setup main menu	15
9. Support files menu	16
10. Weapons type maintenance	17
11. ADA table maintenance	17
12. Flying target model maintenance	18
13. PHTS target model maintenance	18

CONTENTS (Continued)

	Page
Figure 14. RTS stations maintenance	19
15. Setup criteria view/maintenance	19
16. Re-index files utility	20
17. Fixed parameters	21
18. Scenario maintenance (FTS options)	22
19. Scenario maintenance (PHTS options)	22
20. Scenario maintenance (alternative scenario option)	23
21. Positions maintenance	24
22. Positions maintenance (DAS option)	25
23. Range layout diagram	26
24. Tools main menu	27
25. RTS range layout	30
26. RTS system cabling diagram	33
27. PLS cabling diagram	35
28. LBS cabling diagram	35
29. Generator control console	36
30. Pan tilt & camera controls	37
31. Laser control unit (PLS and LBS)	38
32. DAS main power switch	38
33. Menu description and instruction	42
34. Main menu to sub menus	44
35. Sub menus to main menu	45
36. Exit RTS prompt	46
37. RCS main menu	47

CONTENTS (Continued)

	Page
Figure 38. Test menu	47
39. PTS selection menu	48
40. PTS commands menu	49
41. Orientation prompt	49
42. Orientation status	50
43. Status request	50
44. PLS commands menu	51
45. PLS track window	51
46. Launch position number	52
47. PLS status window	52
48. Calibration menu	53
49. Select scenario menu	54
50. Select scenario prompt	54
51. Scenario parameters	55
52. FTS scale prompt	56
53. Launch number prompt	56
54. PTS download	57
55. DAS download	57
56. Scenario setup	58
57. RCS realtime range fan display	58
58. Scenario upload	60
59. Scenario release	60
60. Feedback menu	61
61. Trial crew prompt	62

CONTENTS (Continued)

	Page
Figure 62. Trial scenario prompt	62
63. Trial repetition prompt	63
64. Trial feedback screen	63
65. Score option	64
66. Offload menu	64
67. AWSO option	65
68. DBF option	65
69. DAS main menu	66
70. Test menu	66
71. Weapon test	67
72. Calibrate menu	68
73. PTS selection	69
74. Up command	69
75. Unmasked command	70
76. Raised command	70
77. Down command	70
78. Masked command	71
79. Status	71
80. SSN menu	72
81. Squad leader SSN	73
82. Gunner SSN	73
83. Remote mode	74
84. Waiting for start	74
85. Realtime	75

5

CONTENTS (Continued)

	Page
Figure 86. PTS data entry window	76
87. PTS and FTS realtime	76
88. FTS data entry window	76
89. Feedback menu	78
90. Feedback	78
91. PLS main menu	80
92. PLS test menu	80
93. Target tracking window	81
94. Semi-auto and off track labels	82
95. PLS trackball console	82
96. "Automatic" label	83
97. "Manual" label	83
98. Laser "Failed" label	84
99. Position prompt	85
100. Orientation window	85
101. Scoring crew numbers	87
102. Scoring report	89

MULTIPLE-STATION RANGE TARGET SYSTEM OPERATIONS MANUAL

Introduction

Manual Format

Introduction. This chapter begins with a description of the format and use of this manual. This chapter also describes the RTS, its major components, and the performance feedback generated by the system. The chapter concludes with a list of the primary procedures in the order in which they are conducted. These procedures are referenced according to where they are described in the manual.

RTS setup. This chapter provides information on how to create scenarios and scenario sets. Interactive menus used with the RTS setup program are shown and described. Also included is information on the specification of conditions and constants to be enforced during training applications.

System preparation and installation. This chapter provides information on getting the RTS ready for use. Instructions are provided on choosing a location for the RTS, unpacking the equipment, emplacing the RTS components, connecting the RTS stations, registering the locations of RTS components, and energizing the RTS stations.

Operations. This chapter explains the sequence of procedures performed during the conduct of an RTS training application. System start-up, operate, and shut-down procedures are described. Interactive menus used during operations are presented and described according to each of the system stations. Subsections include information on energizing the system, testing and calibrating system components, initializing scenarios, performing realtime operations, and post-processing data.

Maintenance and supply. This chapter provides information on obtaining maintenance service and support. Included is information about contractor-provided maintenance and available customer-support assistance. Also included are recommended supplies and provisioning lists to ensure the operational reliability of the system and related vendor documentation on the various off-the-shelf components provided with the system.

Glossary. This chapter provides definition of terms used throughout this manual.

List of abbreviations and acronyms. This chapter provides a list of the abbreviations and acronyms used throughout this manual.

References. This chapter provides a list of references cited in the text.

System Description

RTS is a high-fidelity Short Range Air Defense (SHORAD) and Forward Area Air Defense (FAAD) engagement simulator. RTS is used to conduct Engagement Simulation Exercises (ESX) or Live Fire Exercises (LFX) for 14- and 16-Series (14S, 16P, 16R, 16S) Military Occupational Specialties (MOS). Thus, RTS can be employed using the Line-of-Sight Rear (Avenger), the Chaparral Missile System, the Product Improved Vulcan Air Defense System (PIVADS), the Basic Vulcan Gun System, or the Stinger Man Portable Air Defense System (MANPADS). MOS 14S, 16P, 16R, and 16S trainees, PFCs, SP4s, and SGTs, and 14S, 16P and 16R SSGTs are responsible for engaging enemy aircraft. As of December 1987, these personnel constituted 56.5 percent of all enlisted air defenders. The RTS, designed to be a crew engagement training and evaluation system for these personnel, can therefore address the training requirements for over half the Army Air Defense population.

RTS has the capability to be moved from one location to another and to be rapidly emplaced for a new training exercise or test application. RTS allows the training of individuals, crews, and platoons and the evaluation of individual crew task performance and collective crew summary performance. RTS also provides detailed crew performance scoring and feedback, which can be scenario-specific or averaged over several scenarios.

RTS can be used in combination with air defense engagement range tables provided with the system to enable the qualification of SHORAD and Forward Area Air Defense System (FAADS) personnel. These range tables are based on difficulty-scaled scenarios and approved performance standards. Using RTS along with the range tables enables the evaluation of soldier strengths and weaknesses and aids in focusing subsequent remediation and sustainment training.

RTS is the direct result of several years of field tests using the Realistic Air Defense Engagement System (RADES). This air defense research was conducted jointly by the U.S. Army Research Institute (ARI) and Science Applications International Corporation (SAIC). Through this research and the subsequent RTS validation effort, RTS and RADES have been shown to be valid test and training simulators. They have generated the data used to derive and validate performance standards for air defense, and have enabled the identification of engagement task workload indexes and the subsequent determination of training and test scenario difficulty levels.

Feedback

Immediate feedback is available to the trainee in terms of task performance and engagement outcomes. The same feedback is available to the instructor-evaluator. Feedback is provided for training and test purposes since the instructor, researcher, or evaluator will require continuous task and summary feedback on the exercising troops, and the trainee will require knowledge of results of his responses.

Feedback is needed when any of the following conditions exist: the range tables are to be employed for qualification and certification of soldiers; soldier performance will be compared to standards to identify strengths and weaknesses; the instructor wants to determine the skill level of the soldiers for varying levels of scenario difficulty; research will be conducted to determine experimental effects on performance; or the practicing crew requires knowledge of results to improve engagement performance. The system can operate with the immediate feedback capability disabled, if repeated practice without feedback is desired for a given application.

Performance feedback is available for every target presented in a scenario. Feedback on the following team leader events is provided in terms of target range and elapsed time: detection, identification, and command to engage or cease fire. Feedback on the following gunner events is provided in terms of target range and elapsed time: acquisition, interrogation, lock-on, superelevation, fire, reattack. Some of these events are weapon-specific. The following collective summary feedback is also provided: identification accuracy, friends and hostiles engaged, engaged aircraft destroyed, friends and hostiles killed, and hostiles releasing ordnance.

In ESX mode, gun systems can be equipped with a Laser Simulator to permit the scoring of ballistics effects. The laser is mounted on the weapon and runs off weapon system power. Each time the weapon trigger is depressed, the number of bursts, rounds on target, target range, average miss distance, and average hit point are calculated, displayed, and recorded. Additionally, the gunner receives accurate simulation of the tracer round through the sight reticle of the weapon.

Feedback can be provided in both ESX and LFX modes. However, the LFX mode applies only to 20mm gun systems. The only difference in the hardware configuration between ESX and LFX modes is that a Bullet Counter is included in LFX mode, instead of the Laser Simulator, for assessing gun system hits. Bullet counter sensing devices relay target hit information to the ground station, located at the Range Control Station (RCS) position, for each burst of fire. Bullet counting devices and services are not part of the RTS system. They are available at live-fire ranges if requested.

Feedback can also be provided with respect to target visual effects signatures, which indicate hits levied on a target by an engaging crew. The realtime engagement effects assessment program is able to determine whether or not a kill will occur, given the flight path or position of the target, the trajectory of the round, and the elapsed time since missile or round launch. Kill and hit effects signatures are not released from either stand helicopters or flying targets during LFX applications. When multiple fire units are engaging the same threat in ESX, the effects signatures are disabled.

Visual engagement effects signatures are manually released on flying targets by signals transmitted by the pilots. The system operator will order the target pilot to "release effects" if a kill was awarded. The pilot activates a switch on his transmitter, uplinking a command to inject oil into the aircraft's exhaust system. The smoldering oil produces the smoke signature which indicates a "kill."

Effects signatures are automatically released under software program control on all pop-up helicopter targets. For RTS pop-up helicopter targets, the program determines whether the target will be unmasked (i.e., available) at the time of round or missile intercept. The program already knows the helicopter position, and controls when the target will unmask and mask. If a kill is assessed on a pop-up helicopter, the program will automatically send the effects release command to that helicopter. This causes the helicopter to emit the standard smoke signature and to become masked. Smoke and sudden masking, indicate a kill. If a miss is determined, a smoke signature will not be evident, and the target will remain raised until it receives the prescribed lower command.

For missile systems, (i.e., Avenger, Chaparral and Stinger) a kill is awarded if all gunner actions captured from the weapon system are correct (such as acquire, lock, superelevate and fire, for the Stinger). For gun systems (i.e., Vulcan and PIVADS), a kill is awarded according to the number of rounds on target. For a medium difficulty scenario, it takes at least 8 rounds on target to be awarded a kill. The only other factors that can prevent a kill from occurring would be if the target was out of weapon range, was masked at the time of missile or round intercept, or was in the weapon system's dead zone.

Major RTS Components

Figure 1 depicts a block diagram of the RTS configuration. The primary components include the Flying Target Systems (FTS), the Pop-up Target Systems (PTS), the Range Control Station (RCS), the Data Acquisition Station (DAS), and the Position Location Station (PLS).

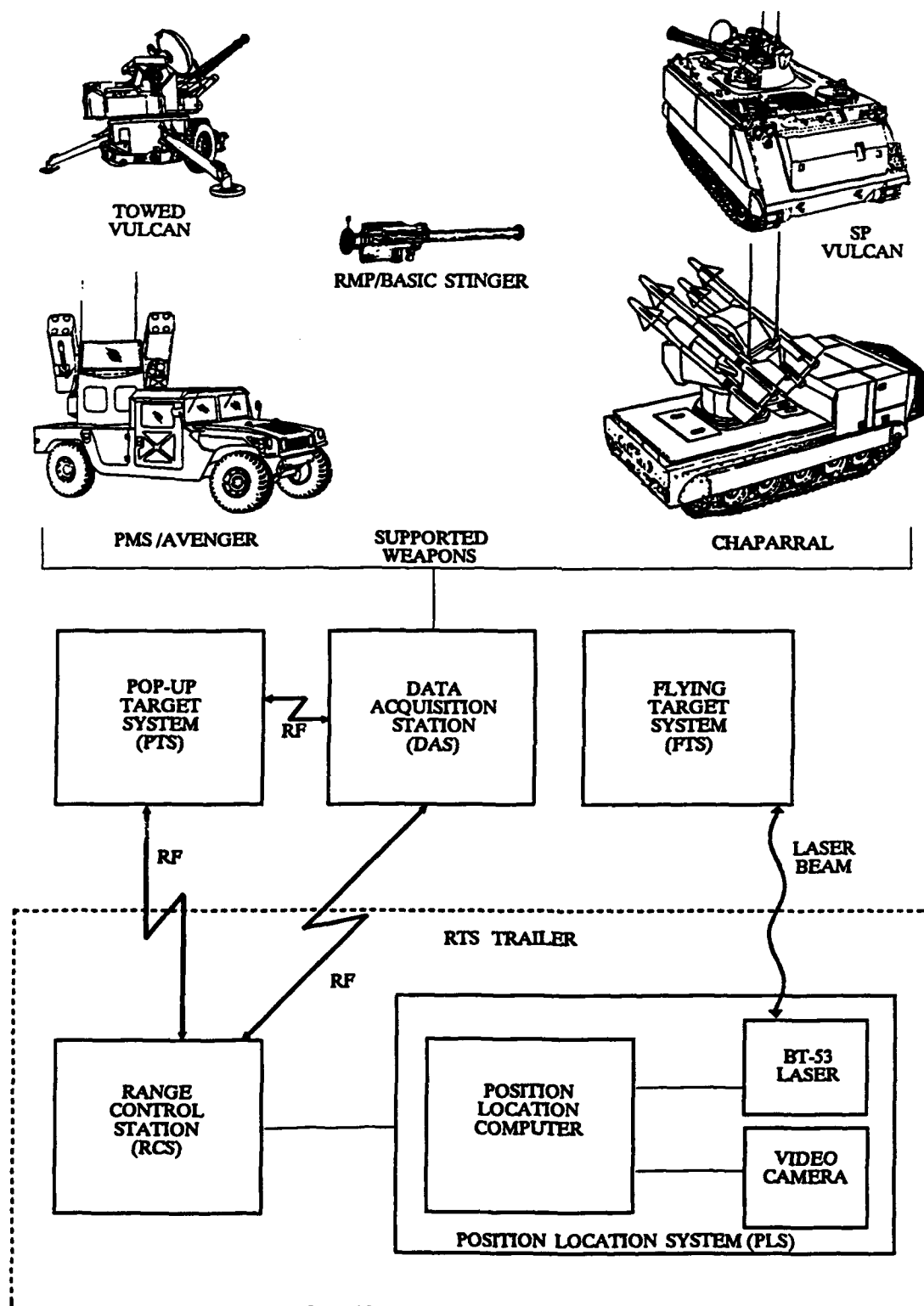


Figure 1. RTS configuration.

Targets. RTS currently uses 1/5 scale rotary and fixed-wing targets, although other scales are accommodated. All targets represent actual NATO or WARSAW PACT aircraft. Aircraft are camouflaged, three dimensional, molded fiberglass replicas. They are either flown remotely according to prescribed flight paths and maneuvers or pop-up from designated positions via stand-lift devices.

Scale targets offer several advantages over full scale, the greatest being cost savings. Unlike full scale aircraft, scale targets are very inexpensive to operate, repair and maintain, and require few resources to support them. Scale targets do not have inherent logistical, planning, and time constraints associated with their employment. Thus, they are more dependable. Another advantage is the reduction in range space required (1/5 of the usual space). Further, scale targets are extremely reliable. As many as 30 flights per flying aircraft have been performed with minor repairs. Pop-up targets may last indefinitely. Because scale targets are smaller and therefore closer to the control area, scenarios can be replicated with greater accuracy to ensure consistency, and can be completed in a shorter time to enable maximum training efficiency.

The use of scaled targets has been validated several times (Barber, 1987; Drewfs, Barber, Johnson, & Frederickson, 1988). Scale targets elicit engagement performance representative of their full scale counterparts. That is, responses to scale targets were shown to be not significantly different from responses to full scale aircraft, given similar test conditions (Barber, 1987; Drewfs, et al., 1988). Additionally, tests using scaled targets repeatedly have generated equivalent performance results, thereby demonstrating consistency over time (Barber, 1987; Drewfs, et al., 1988).

RTS uses 1/5 scale targets for a number of reasons. The 1/5 scale aircraft have greater payload than smaller scales. This enables them to carry special instrumentation necessary for various field test applications. This scale also allows more accurate visual representation without compromising aircraft stability and maneuverability. Further, 1/5 scale allows weapons such as the Vulcan to engage a target at simulated full scale weapon range, without being outside of the normal range envelope in actual distance (i.e., will activate the ready-to-fire indicator at ranges as close as 200 meters, representing 1 kilometer in full scale).

Flying Targets are radio-controlled sub-scale aircraft that are part of the Flying Target System (FTS) (see Figure 2). The FTS requires highly trained radio control pilots and maintenance personnel to support it.

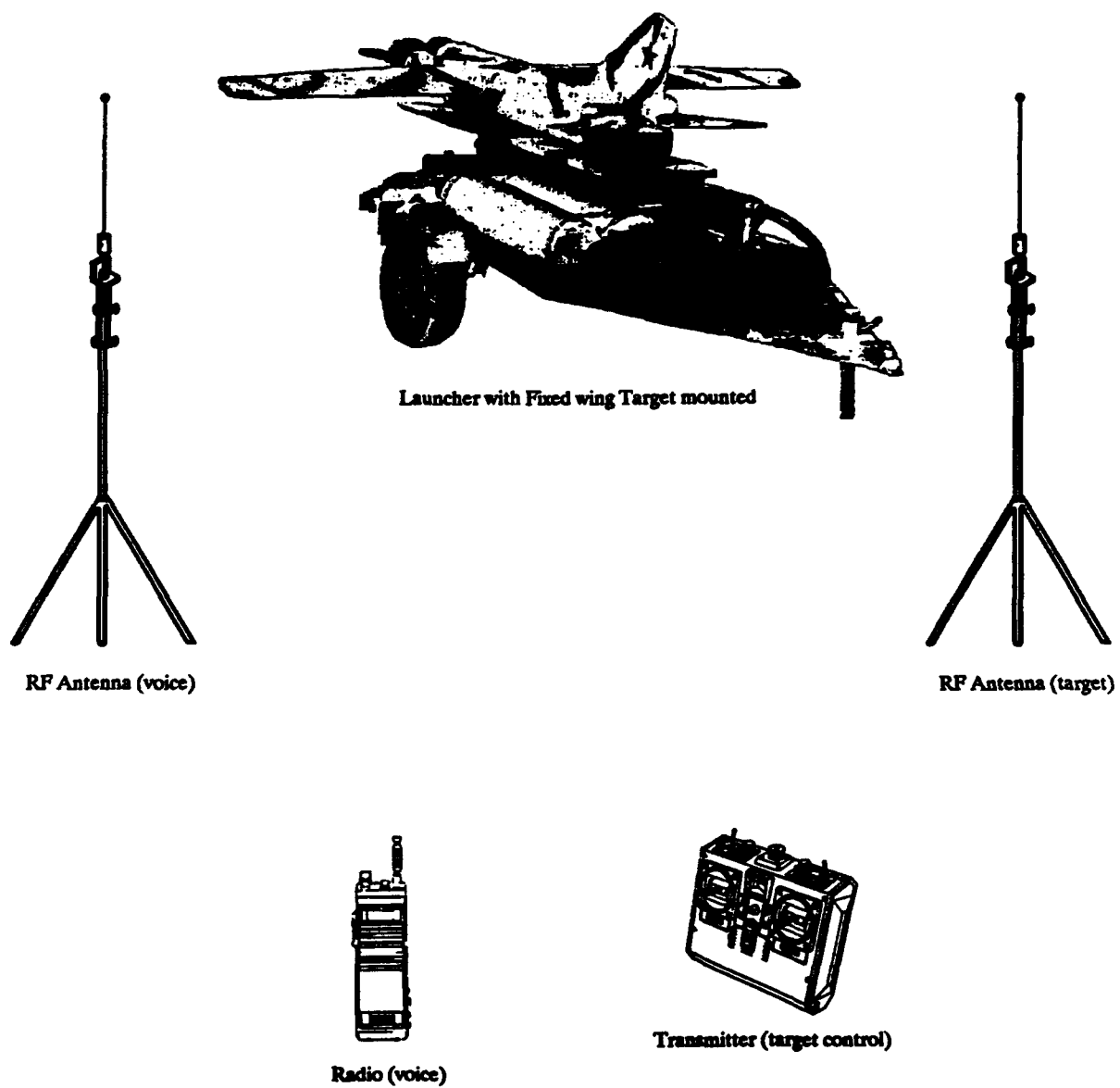


Figure 2. Flying Target System.

Helicopter targets are mounted on Pop-up Target Systems (PTS). The PTS are self-contained in their own towable trailers (see Figure 3). The PTS provides the means for the rotary wing target to simulate a pop-up and hover maneuver. The PTS connects to the RCS via RF Data link. This data link provides the ability for remote control of the PTS. PTS can be used under automatic (scenario-driven) or manual (operator-induced) control. Up to 12 PTS can be used at one time in the RTS.

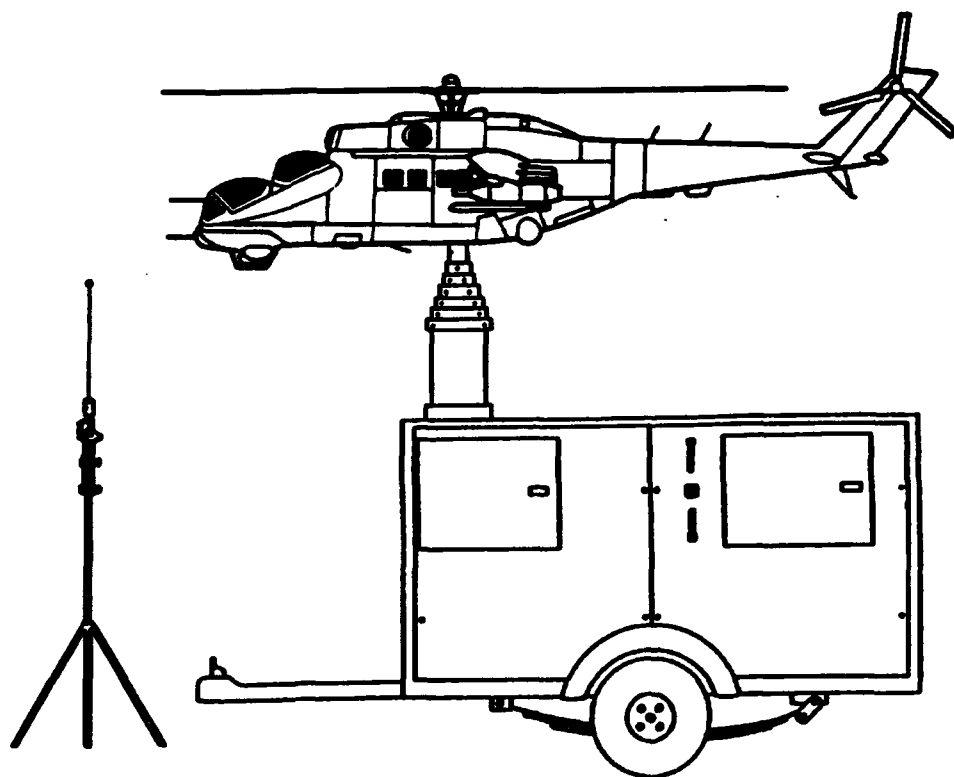


Figure 3. Pop-up Target System.

Range Control Station (RCS). The RCS is the central control point for all RTS operations (see Figure 4). The RCS is the station where system test and calibration checks, initialization of the system, realtime functions, performance scoring, and printing are initiated. The RCS is portable, allowing the user to easily relocate the base of operations.

The RCS consists of a computer with monitor and keyboard, a hardcopy printer, a color camera monitor, and a trackball (the camera monitor and trackball are components of the PLS, they are located with the RCS for ease of system operations).

A Radio Frequency (RF) Modem, provides a data communications link between the RCS and the PTS and DAS.

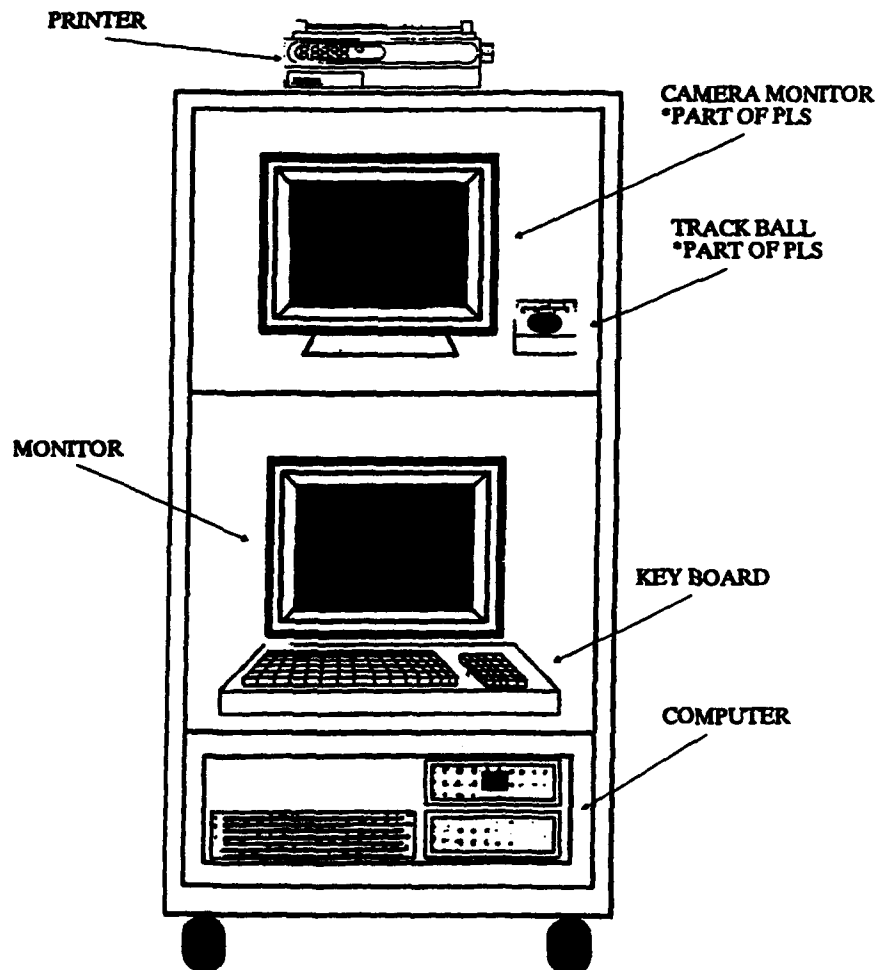


Figure 4. Range Control Station.

Data Acquisition Station (DAS). The DAS (see Figure 5) captures all of the Squad Leader and Gunner engagement task and weapon events as a function of elapsed time and aircraft range. Effects scoring and assessment of kills are also performed at the DAS. The DAS provides scenario feedback on these events. The DAS consists of a station computer with monitor and keyboard, a Weapon System Interface (WSI), and a Uninterruptable Power Supply (UPS).

The DAS is connected to the RCS for purposes of data communications, using cable or RF data link. The weapon system interface connects the DAS to the weapon system. It handles all critical weapon inputs regardless of the SHORAD weapon system in use. Weapon inputs to the DAS are tested prior to the start of a test or training application using the test panel on the WSI. This device is used to verify that all weapon data acquisition functions at the DAS are operating properly prior to the actual hook-up of the weapon.

The DAS is usually manned by an instructor-evaluator. Up to 8 DAS with weapons can be simultaneously supported by RTS.

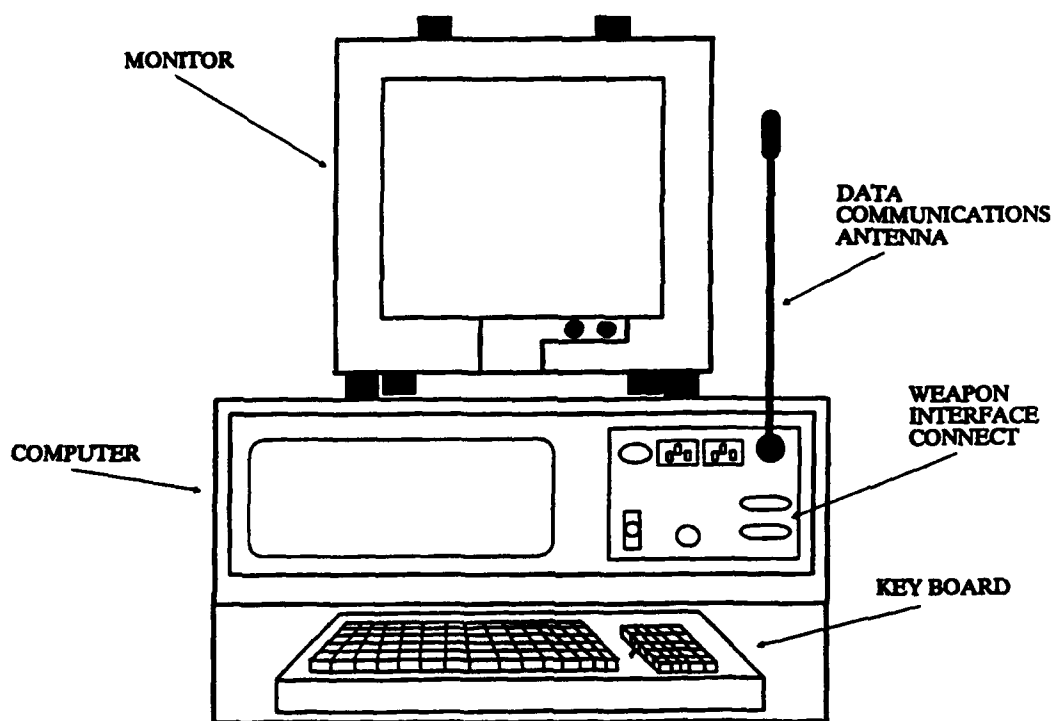


Figure 5. Data Acquisition Station.

Position-Location Station (PLS). The PLS (see Figure 6) is used for two key purposes. First, it is used to register (ground locate) the RCS, the DAS, the PTS, and the FTS launch positions. Second, it is used to track and range flyable targets during a scenario. The PLS has the ability to detect, acquire, and track flyable targets automatically. However, it can also be operated manually using the trackball.

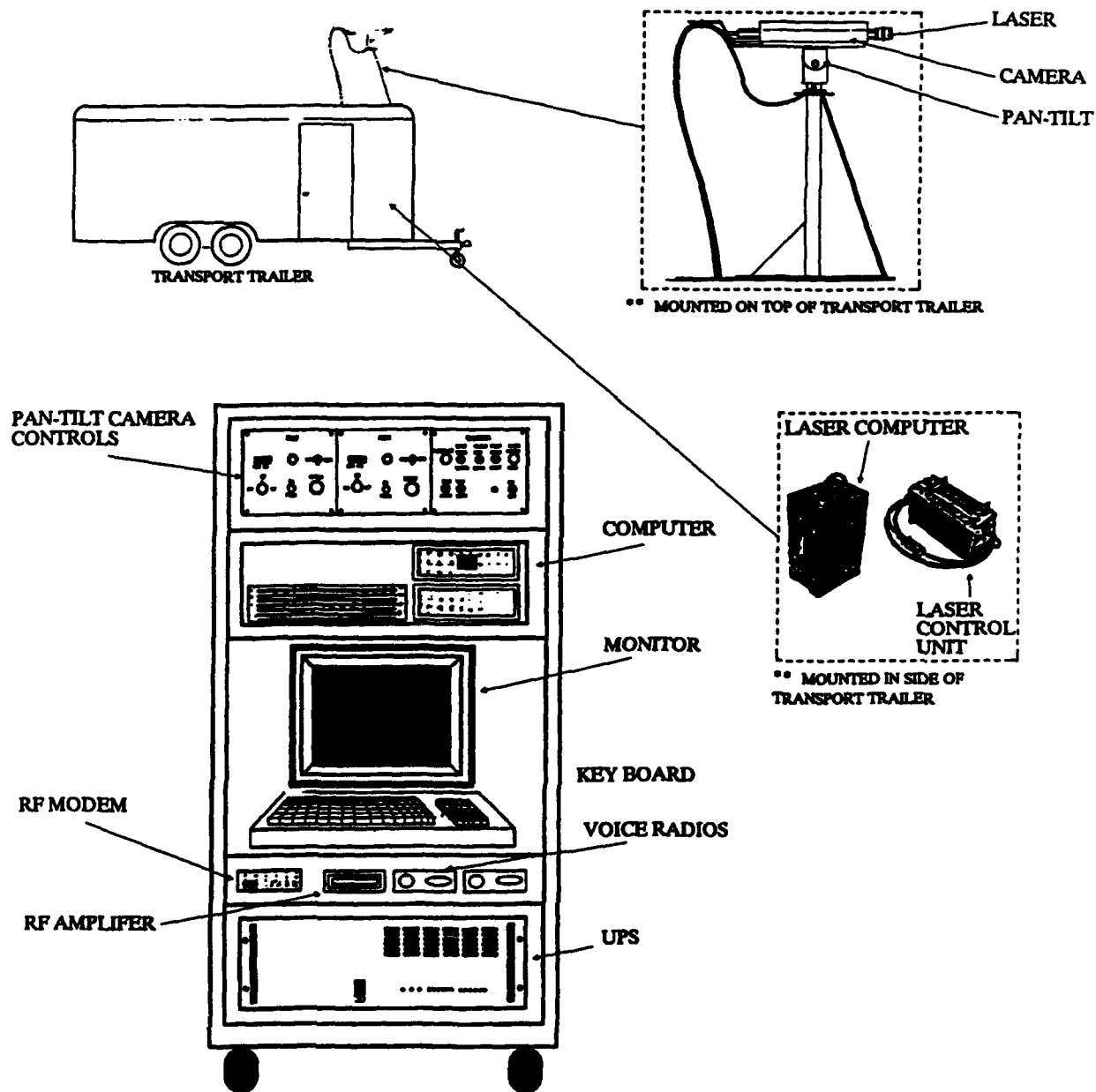


Figure 6. Position-Location Station.

The PLS consists of a computer with monitor and keyboard, a laser unit, laser retro-reflectors, a long range wide-angle color camera, a camera color monitor, a special purpose laser computer, a pan-tilt assembly and control, a trackball, a UPS, RF modem, and voice radio.

Laser Ballistics Simulator (LBS). RTS includes additional capabilities for use with Vulcan and PIVADS weapons during engagement simulation exercises. One such capability is the measurement and feedback of number of bursts, rounds-on-target, mean miss distance and direction, and central hit point. Another is through-the-reticle flyout of tracer rounds in a high-fidelity ballistic simulation at the weapon. All these capabilities are provided by the SAAB BT-53 Laser Simulator, which is interfaced to the DAS.

The LBS (see Figure 7) consists of a laser unit, special purpose laser computer, tracer unit, elevation sensor unit, trigger device unit, feedback control unit, and power supply. All of these devices are mounted on the 20mm gun system, and provide a very powerful free play capability, while also extending the gun system scoring capabilities of the RTS.

RTS Procedures Overview

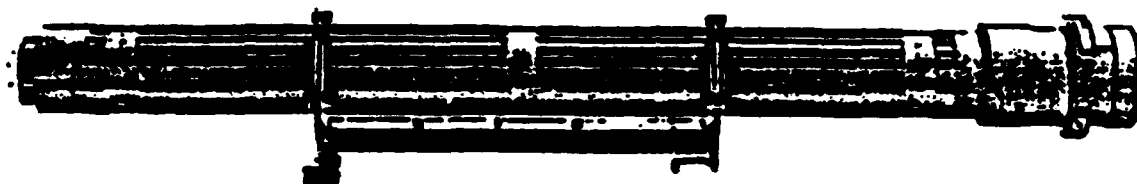
The three major areas of operation follow.

System preparations. This involves the startup of the system, the test and calibration of system components to verify operability, the entering of crew identification information, and the selection of scenarios to run.

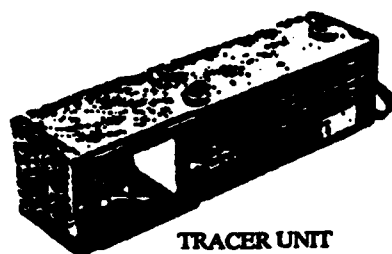
Realtime operations. This involves the actual execution of scenarios, the collection and upload of data from the weapons and soldiers, and the scoring of performance for immediate feedback to the troops on a trial-by-trial basis.

Post-processing operations. This involves the aggregation of performance data after the execution of one or more scenarios, or an entire training or test application. Summary feedback is generated and reports on performance are output to the printer. System shutdown is the last procedure to be performed.

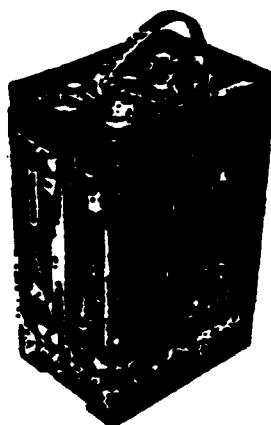
Table 1 lists the primary procedures in the order in which they are normally performed. Included is a reference to the section in this manual where the procedures are described in detail.



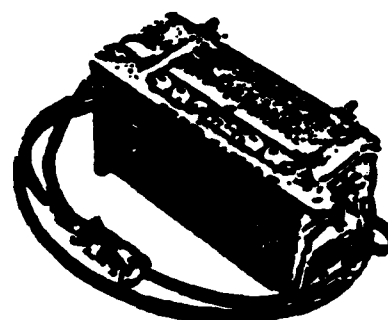
LASER UNIT



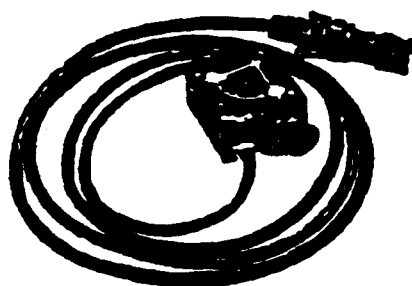
TRACER UNIT



SPECIAL PURPOSE
LASER COMPUTER



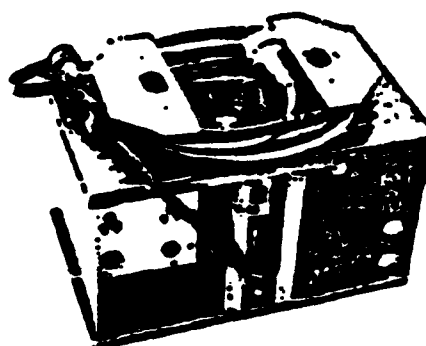
FEEDBACK CONTROL UNIT



ELEVATION SENSOR UNIT



TRIGGER DEVICE UNIT



POWER SUPPLY

Figure 7. Laser Ballistics Simulator.

Table 1**List of Procedures in RTS Operations**

PROCEDURE	PAGES
Set Up RTS Software Files (RTSETUP)	15 through 26
Selecting a Site	28 through 30
Unpacking the RTS	30 through 31
System Cabling	31 through 34
System Startup and Shutdown	35 through 37
System Registration	37 through 39
PTS Test (RCS)	47 through 49
PLS Test (RCS)	50 through 52
PLS Test (PLS)	79 through 84
PTS Calibrate (DAS)	65 through 70
Run Test Scenario (Mixed) (RCS)	53 through 59
Weapon System Test (DAS)	65 through 67
Input Crew's SSN (DAS)	71 through 72
Realtime (RCS)	53 through 59
Enter Realtime Data (DAS)	72 through 76
Scenario Feedback (DAS)	77 through 78
Scenario Feedback (RCS)	60 through 63
Scoring Report (RCS)	86 through 87
Offload (RCS)	87 through 88

RTS Setup

RTS setup must be performed to configure data files used in RTS. Run RTS setup to identify the weapon system to be used, the location of stations and PHTS, the scenarios to be run, and the training or test conditions. These data are input into the RCS computer. This is done only once for a given application. The data are changed only when there is a change in weapon type, the user wishes to add scenarios to the scenario library, or RTS components are to be relocated. This section describes the procedures for specifying the constants, scenarios, weapon, and target descriptions.

Unpack the RCS station computer (computer, monitor and keyboard) and printer (refer to System Preparation and Installation Section). Attach the computer and printer, and plug them into a 115 volt power source (refer to vendor manuals on the computer and printer for more information). The RCS will automatically boot itself, resulting in the display of the main menu. Press the <<ESC>> key. A message will ask if RTS is to be terminated; answering "Yes" will automatically return the RCS to the operating system.

To enter the RTS setup program, type "RTSETUP" at the RCS keyboard after the operating system prompt (-) and press <<ENTER>>. This will result in the display of the RTS setup main menu (see below). Select the desired utility by typing the letter which corresponds to the option.

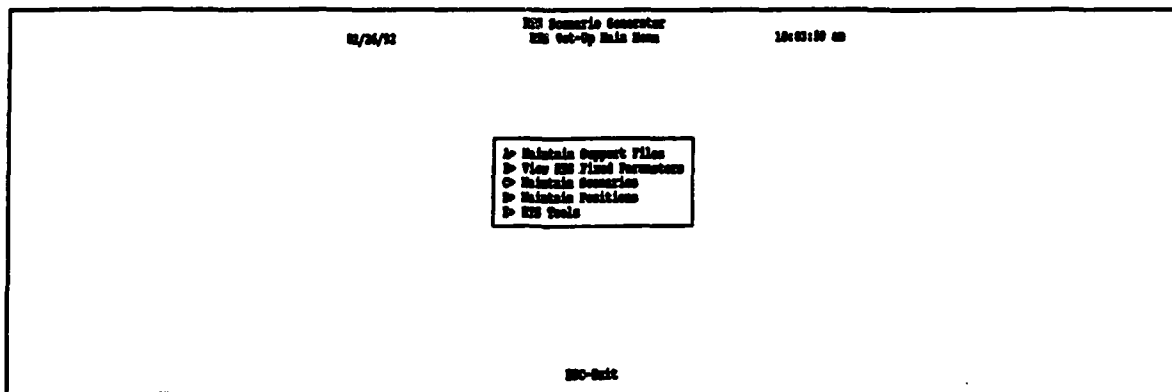


Figure 8. RTS setup main menu.

Maintain Support Files

This is the first option in the main menu (option "A"). Select this option to add, delete, edit and view any selection listed on the menu (see Figure 9).

03/26/93	RTS Scenario Generator RTS Support Files Menu	10:11:01 am
- A> Maintain Weapons Types - B> Maintain ADA Table Codes - C> Maintain Flying Models - D> Maintain PMS Models - E> Maintain RTS Stations - F> Maintain Criteria Records - R> Re-create File Indices		
ESC-Exit		

Figure 9. Support files menu.

Select the "Maintain Weapons Types" (option "A") from the support Files Menu to specify the weapon(s) to be used (see Figure 10). Press the <<F2>> key to add weapons. To delete a weapon press <<F3>>, and to recall an item press <<F4>>. The weapon number is displayed on the left of the screen. The current weapon type being edited will be displayed on the right. Scrolling through the numbers on the left (using the up or down arrow keys) will result in a change in the descriptions on the right to correspond with the weapon number highlighted. To edit a selection, press <<ENTER>> when the highlighter is on the appropriate weapon code number. Scroll through the options on the right and make any desired changes. There is one restriction: the available codes for Projectile Type are shown at the bottom left of the display (see Figure 10).

NOTE

Classified data are not to be entered into this system.

02/26/92
RTS Scenario Generator
Weapons Type Maintenance
10:16:47 am

Cde Name.....

1 Chaparral
2 Redeye
3 Stinger Basic M
4 Vulcan
5 PIVADS 20mm Gun
6 AVENGER

Weapon Code.....: 1
Weapon Name.....: Chaparral
Projectile Type.: 2->Ballistic
Max'm Range.....: 6000/Meters
Min'm Range.....: 200/Meters
Velocity.....: 800/Mtrs/Sec
Fire Count.....: 1/Aquist'n
Hits Req'd/Kill...: 1/to Kill

1->Fire and Forget
2->Ballistic Rounds
3->Guided Missile

[ESC-Exit][+-Arrows][Pg-Up][Pg-Dn][F2-Add][F3-Delete][F4-Recall][←] to Edit

Figure 10. Weapons type maintenance.

The "Maintain ADA Table Codes" (option "B") of the Support Files Menu is for identifying applicable range tables (see Figure 11). These tables represent the annual qualification tests for Stinger, Chaparral, and Vulcan or PIVADS weapon crews. This menu will not be needed unless the government changes the range tables or descriptions.

02/26/92
RTS Scenario Generator
ADA Table Maintenance
10:19:33 am

Code	Table Name	Table Description.....
000	UNKNOWN	UNKNOWN
001	I	BASIC
003	III	BASIC ENGAGEMENT (STATIC CREW)
004	IV	INTERMEDIATE ENGAGEMENT (STATIC CREW)
005	V	TEST

[ESC-Exit][+-Arrows][F2-Add][F3-Delete][F4-Recall][←] to Edit

Figure 11. ADA table maintenance.

"Maintain Flying Models" (option "C") of the Support Files Menu is used to list the flying target model types (see Figure 12). The code numbers with aircraft model names are listed on the left. The information corresponding to the selection on the left is listed on the right. All information can be edited. Available Friend Foe and Aircraft Type codes are displayed on the bottom left of the screen.

02/26/92			RTS Scenario Generator		10:20:32 am	
Flying Target Model Maintenance						
Cds Typ Designation....						
002	1	FROGFOOT				
003	1	FLOGGER				
005	1	FENCER				
006	1	FITTER A				
009	1	FITTER				
010	1	FITTER				
011	1	FITTER				
013	2	HIND-D				
015	2	HIP				
017	2	HOKUM				
019	2	HAVOC				
1→Fly FW 2→Fly RW			Model Code.....: 002 Friend/Foe.....: 2→Hostile Aircraft Type...: 1→Fixed Wing Model Nick-Name..: FROGFOOT Model Name.....: SU-25 Model Available..: Yes			
1→Friend 2→Hostile						
[ESC-Exit] [←-Arrows] [Pg-Up] [Pg-Dn] [F2-Add] [F3-Delete] [F4-Recall] [←] to Edit]						

Figure 12. Flying target model maintenance.

The "Maintain PHTS (PTS) Models" (option "D") of the Support Files Menu is used to list the pop-up helicopter target system model types (see Figure 13). Like the previous option, Friend/Foe and Aircraft Type codes that are available are displayed on the bottom left of the screen. Information about the aircraft are presented on the right.

02/26/92			RTS Scenario Generator		10:22:41 am	
PHTS Target Model Maintenance						
Cds Typ Designation....						
002	3	HIND-D				
005	3	HIP				
007	3	HAVOC				
009	3	HOKUM				
001	3	APACHE				
003	3	BLACK HAWK				
004	3	BUEY COBRA				
006	3	INOCUOUS				
008	3	JOLLY GWN GIANT				
3→PHTS			Model Code.....: 002 Friend/Foe.....: 2→Hostile Aircraft Type...: 3→PHTS Model Nick-Name..: HIND-D Model Name.....: MI-24 Model Available..: Yes			
1→Friend 2→Hostile						
[ESC-Exit] [←-Arrows] [Pg-Up] [Pg-Dn] [F2-Add] [F3-Delete] [F4-Recall] [←] to Edit]						

Figure 13. PHTS target model maintenance.

"Maintain RTS Stations" (option "E") of the Support Files Menu is used to identify an RTS station(s) by numeric codes and descriptions (see Figure 14). The RTS components are listed on the left. The limits on these stations are listed on the right. The only restrictions to the station limits are the number of components available. For example, if there are only 6 PTS target systems defined, only six numbers can be used as codes (usually 1 through 6). These codes will identify which PTS will appear during scenario development and execution.

02/26/92
RTS Scenario Generator
RTS Stations Maintenance
10:23:09 am

Cde Station ID.....

000 FRTS

100 DAS

200 FLS

249 REG

253 LAUNCH

254 RCS

Station Code..... 000

Station ID..... FRTS

Station Name..... FRTS-TAST

Station Limits... 6

[ESC-Exit] [↑-Arrows] [Pg-Up] [Pg-Dn] [F2-Add] [F3-Delete] [F4-Recall] [←] to Edit

Figure 14. RTS stations maintenance.

The "Maintain Criteria Records" (option "F") (see Figure 15) of the Support Files Menu is not directly accessible. This option is used to view the current performance standards which are defined according to US Army Air Defense doctrine. These criteria are the accepted standards and are not subject to change without a change in doctrine. In the event that they did change, the corrections would have to be made using the DBASE software utility, which is outside the scope of this manual.

02/26/92
RTS Scenario Generator
RTS Set-up Criteria View/Maintenance
10:25:05 am

Performance Standards Form

Types 1-Fly FW 2-Fly EW 3-FRTS

Criteria Record #..	1	Ordinance Released..	16	Acquire Range.....	0
Difficulty Class...	1	Hits on Target.....	10	MSL Lock-on Time..	2
Target Type.....	3	Aircraft Destroyed:	80	MSL Lock-on Range..	0
Targets Detected..	99	Detection Time.....	4	Elevate Time.....	2
Targets ID'd.....	99	Detection Range.....	0	Elevate Range.....	0
Correct ID's.....	80	ID Time.....	8	MSL Fire Time.....	2
Correct Friend ID:	80	ID Range.....	0	MSL Fire Range....	0
Correct Hostil ID:	85	CMD Engage Time...	1	Gun Lock-on Time..	2
Friends Engaged...	20	CMD Engage Range...	0	Gun Lock-on Range..	0
Hostile Engaged...	85	IFF Time.....	4	Gun Fire Time.....	2
Friend not Killed:	80	IFF Range.....	0	Gun Fire Range....	0
Hostile Killed...	80	Acquire Time.....	4	Max Time Limit....	8

[ESC-Exit] [Pg-Up] Prev [Pg-Dn] Next

Figure 15. Setup criteria view/maintenance.

The "Re-create File Indices" (option "R") (see Figure 16) of the Support Files Menu is used to reindex the system files after changes have been made. For example, if some scenarios were added or changed, this option would have to be invoked to ensure all supporting files had the updated information. Use this option at the end of each editing session to ensure all changes made are consistent across all support files. Invoking this option will automatically execute the reindex process, returning to the main menu when complete. Thus, no further interaction is required.

```

02/26/92                      RTS Scenario Generator
                              Re-Index Files Utility                      10:29:08 am

Re-indexing Weapons Type Description file
Re-indexing ADA Table Codes file
Re-indexing Flying Aircraft Model file
Re-indexing PTS Aircraft Model file
Re-indexing Station Types/Limits file
Re-indexing Scenario Header file
Re-indexing Positions file
Re-indexing Position Constants file
Re-indexing Scenario PTS file

```

Figure 16. Re-index files utility.

View RTS Fixed Parameters

This is the second option in the RTS setup Main Menu (option "B"). Selecting this option will result in a display of the fixed parameters that are employed in developing scenarios (see Figure 17). Select an option on the left of the display by pressing <<ENTER>> when the desired choice is highlighted. This will result in the display of possible option codes on the right of the display. For example, if "PTS Orientations" is selected, each aspect angle (orientation) option available for PTS targets will be displayed on the right (see Figure 17). The appropriate parameters will be input when developing scenarios (for example, a helicopter scenario with 0 aspect [front view]). Examples of this option are displayed below; these parameters are not likely to be changed.

02/26/92

RTS Scenario Generator
RTS Fixed Parameters

10:31:07 am

RTS PHTS Orientations..
RTS IFF Codes.....
RTS Aircraft Intents..
RTS Target Modes.....
RTS Terrains.....
RTS Criteria.....
RTS Station Manning...
RTS Station Links.....
RTS Projectile Types..
RTS Directions.....
RTS O'Clocks.....
RTS Difficulties.....
RTS Target Types.....
RTS Warning Codes.....
RTS Weapons Control...
RTS Cues.....

PHTS Orientations
000→Front View
045→Front/Oblique/Left
090→Left Side View
135→Rear/Oblique/Left
180→Rear View/Tail
225→Rear/Oblique/Right
270→Right Side View
315→Front/Oblique/Right

[ESC-Exit][↑↓-Arrows]

Figure 17. Fixed parameters.

Maintain Scenarios

This is the third option in the RTS setup main menu (option "C"). This selection enables the user to develop scenarios, and is the option most commonly used. Any description item can be edited, added to, or deleted. To edit a particular scenario, position the highlighter over the Scenario # row using the arrow keys. Press <<ENTER>> when scenario number to be edited appears (see Figure 18). To scroll forward or backward (i.e., select a higher or lower scenario number), place the highlighter over the Scenario # row and page up or down using the up or down <<PG>> keys, respectively. To add a scenario, press the <<F2>> key and type in the new scenario number.

Once a scenario has been selected, the scenario descriptions to be edited can be identified by moving the highlighter with the arrow keys. Select a highlighted descriptor by pressing the <<ENTER>> key. The scenario descriptions are listed on the left of the display, with possible options listed on the right (see Figure 18). Relevant descriptors must then be given desired parameters (see Fixed Parameters section preceding this section).

02/26/92	RTS Scenario Generator RTS Scenario Maintenance	10:39:28 am																																				
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: left; padding: 2px;">Scenario Header</th> </tr> <tr><td style="padding: 2px;">Position #.....:</td><td style="text-align: right; padding: 2px;">1</td></tr> <tr><td style="padding: 2px;">Scenario #.....:</td><td style="text-align: right; padding: 2px;">1</td></tr> <tr><td style="padding: 2px;">Difficulty Code.:</td><td style="text-align: right; padding: 2px;">0</td></tr> <tr><td style="padding: 2px;">#/Flying Targets:</td><td style="text-align: right; padding: 2px;">0</td></tr> <tr><td style="padding: 2px;">#/PHTS Targets..:</td><td style="text-align: right; padding: 2px;">0</td></tr> <tr><td style="padding: 2px;">ADA Gun Table...:</td><td style="text-align: right; padding: 2px;">0</td></tr> <tr><td style="padding: 2px;">Terrain Type....:</td><td style="text-align: right; padding: 2px;">0</td></tr> <tr><td style="padding: 2px;">AD Warning.....:</td><td style="text-align: right; padding: 2px;">0</td></tr> <tr><td style="padding: 2px;">WCS Code.....:</td><td style="text-align: right; padding: 2px;">0</td></tr> <tr><td style="padding: 2px;">Alert Time.....:</td><td style="text-align: right; padding: 2px;">0</td></tr> <tr><td style="padding: 2px;">Cue Type.....:</td><td style="text-align: right; padding: 2px;">0</td></tr> <tr><td style="padding: 2px;">Cue Time.....:</td><td style="text-align: right; padding: 2px;">0</td></tr> <tr><td style="padding: 2px;">Alt Scenario.....:</td><td style="text-align: right; padding: 2px;">1</td></tr> </table>	Scenario Header		Position #.....:	1	Scenario #.....:	1	Difficulty Code.:	0	#/Flying Targets:	0	#/PHTS Targets..:	0	ADA Gun Table...:	0	Terrain Type....:	0	AD Warning.....:	0	WCS Code.....:	0	Alert Time.....:	0	Cue Type.....:	0	Cue Time.....:	0	Alt Scenario.....:	1	<table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr><th style="text-align: left; padding: 2px;">Scen. FTS Defined</th></tr> <tr><td style="height: 30px;"></td></tr> </table> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr><th style="text-align: left; padding: 2px;">FTS Launch Stations</th></tr> <tr><td style="text-align: center; padding: 2px;">1</td></tr> <tr><td style="text-align: center; padding: 2px;">2</td></tr> <tr><td style="text-align: center; padding: 2px;">3</td></tr> <tr><td style="text-align: center; padding: 2px;">4</td></tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><th style="text-align: left; padding: 2px;">FTS Stations</th></tr> <tr><td style="text-align: center; padding: 2px;">1</td></tr> </table>	Scen. FTS Defined		FTS Launch Stations	1	2	3	4	FTS Stations	1
Scenario Header																																						
Position #.....:	1																																					
Scenario #.....:	1																																					
Difficulty Code.:	0																																					
#/Flying Targets:	0																																					
#/PHTS Targets..:	0																																					
ADA Gun Table...:	0																																					
Terrain Type....:	0																																					
AD Warning.....:	0																																					
WCS Code.....:	0																																					
Alert Time.....:	0																																					
Cue Type.....:	0																																					
Cue Time.....:	0																																					
Alt Scenario.....:	1																																					
Scen. FTS Defined																																						
FTS Launch Stations																																						
1																																						
2																																						
3																																						
4																																						
FTS Stations																																						
1																																						
[ESC-Exit][↑↓-Arrows]Pg-Up>Prev[Pg-Dn>Next[F2-Add][←] to Edit]																																						

Figure 18. Scenario maintenance (FTS options).

Entering old or new scenarios, editing them, and giving parameters to them is a completely prompted and interactive process. There may be several areas within each descriptor that must be edited. Edit each item in sequence through the last area; the highlighter will then automatically return to the descriptors (left) side of the screen. A scenario may have more than one target. For example, if three PHTS are scripted, three sets of parameters will be entered. The PHTS portion of the scenario is entered by selecting "#/PHTS Targets". After the first target is edited, the system will prompt for the next one. Enter the next PHTS target stand number (such as stand 3, or 8), or 0 if there are no more, and continue (see Figure 19).

02/26/92	RTS Scenario Generator RTS Scenario Maintenance	10:38:27 am																																				
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: left; padding: 2px;">Scenario Header</th> </tr> <tr><td style="padding: 2px;">Position #.....:</td><td style="text-align: right; padding: 2px;">1</td></tr> <tr><td style="padding: 2px;">Scenario #.....:</td><td style="text-align: right; padding: 2px;">1</td></tr> <tr><td style="padding: 2px;">Difficulty Code.:</td><td style="text-align: right; padding: 2px;">0</td></tr> <tr><td style="padding: 2px;">#/Flying Targets:</td><td style="text-align: right; padding: 2px;">0</td></tr> <tr><td style="padding: 2px;">#/PHTS Targets..:</td><td style="text-align: right; padding: 2px;">0</td></tr> <tr><td style="padding: 2px;">ADA Gun Table...:</td><td style="text-align: right; padding: 2px;">0</td></tr> <tr><td style="padding: 2px;">Terrain Type....:</td><td style="text-align: right; padding: 2px;">0</td></tr> <tr><td style="padding: 2px;">AD Warning.....:</td><td style="text-align: right; padding: 2px;">0</td></tr> <tr><td style="padding: 2px;">WCS Code.....:</td><td style="text-align: right; padding: 2px;">0</td></tr> <tr><td style="padding: 2px;">Alert Time.....:</td><td style="text-align: right; padding: 2px;">0</td></tr> <tr><td style="padding: 2px;">Cue Type.....:</td><td style="text-align: right; padding: 2px;">0</td></tr> <tr><td style="padding: 2px;">Cue Time.....:</td><td style="text-align: right; padding: 2px;">0</td></tr> <tr><td style="padding: 2px;">Alt Scenario.....:</td><td style="text-align: right; padding: 2px;">1</td></tr> </table>	Scenario Header		Position #.....:	1	Scenario #.....:	1	Difficulty Code.:	0	#/Flying Targets:	0	#/PHTS Targets..:	0	ADA Gun Table...:	0	Terrain Type....:	0	AD Warning.....:	0	WCS Code.....:	0	Alert Time.....:	0	Cue Type.....:	0	Cue Time.....:	0	Alt Scenario.....:	1	<table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <tr><th style="text-align: left; padding: 2px;">Scen PHTS Defined</th></tr> <tr><td style="height: 60px;"></td></tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><th style="text-align: left; padding: 2px;">PHTS Stands Defined</th></tr> <tr><td style="text-align: center; padding: 2px;">1</td></tr> <tr><td style="text-align: center; padding: 2px;">2</td></tr> <tr><td style="text-align: center; padding: 2px;">3</td></tr> <tr><td style="text-align: center; padding: 2px;">7</td></tr> <tr><td style="text-align: center; padding: 2px;">8</td></tr> <tr><td style="text-align: center; padding: 2px;">9</td></tr> </table>	Scen PHTS Defined		PHTS Stands Defined	1	2	3	7	8	9
Scenario Header																																						
Position #.....:	1																																					
Scenario #.....:	1																																					
Difficulty Code.:	0																																					
#/Flying Targets:	0																																					
#/PHTS Targets..:	0																																					
ADA Gun Table...:	0																																					
Terrain Type....:	0																																					
AD Warning.....:	0																																					
WCS Code.....:	0																																					
Alert Time.....:	0																																					
Cue Type.....:	0																																					
Cue Time.....:	0																																					
Alt Scenario.....:	1																																					
Scen PHTS Defined																																						
PHTS Stands Defined																																						
1																																						
2																																						
3																																						
7																																						
8																																						
9																																						
[ESC-Exit][↑↓-Arrows]F2-Add[F6-PHTS R/O]F9-Layout[←] to Edit]																																						

Figure 19. Scenario maintenance (PHTS options).

Scenarios of equal difficulty to the one being edited can be designated as alternates using "Alt Scenario". When scenario presentations begin, there may be several scenarios to choose from within a given difficulty level. This may be useful if the instructor-evaluator wishes to present several alternate training scenarios of like difficulty, or to avoid repeating a scenario in the event of a previous trial abort (see Figure 20).

02/26/92		RTS Scenario Generator RTS Scenario Maintenance		10:42:24 am	
F4--Insert Scenario Header Position #.....: 1 Scenario #.....: 1 Difficulty Code.: 0 #/Flying Targets.: 0 #/Pnts Targets...: 0 ADA Gun Table...: 0 Terrain Type....: 0 AD Warning.....: 0 WCS Code.....: 0 Alert Time.....: 0 Cue Type.....: 0 Cue Time.....: 0 Alt Scenario....: 1		Alternate Loop Scen. 1?		Alternate Scenario Position #.....: 1 Scenario #.....: 1 Difficulty Code.: 0 #/Flying Targets.: 0 #/Pnts Targets...: 0 ADA Gun Table...: 0 Terrain Type....: 0 AD Warning.....: 0 WCS Code.....: 0 Alert Time.....: 0 Cue Type.....: 0 Cue Time.....: 0 Alt Scenario....: 1	
[ESC-Exit] ↑↓-Arrows Pg-Up-Prev Pg-Dn-Next F2-Add F6-Pnts F9-Layout ← for Alt					

Figure 20. Scenario maintenance (alternative scenario option).

Maintain Positions

This is the fourth option of the RTS setup main menu (option "D"). Enter and edit the positions of RTS components. (See Figure 21). The position codes are listed on the right of the screen, associated parameters are listed in the middle, and option codes are listed on the left (see Figure 22). This menu serves two purposes. It enables the development of a preliminary range layout scheme and the printing of an associated hardcopy reference of that layout. The scheme will then be fine-tuned when the system is actually emplaced and registered for a final layout and hardcopy reference. The preliminary range layout is used to define PTS locations relative to the DAS or weapon (coordinates 0,0). Other component locations are determined during deployment.

02/26/92

RTS Scenario Generator
RTS Position Maintenance

10:44:05 am

Position Constants	
Position Number...	1
Position REG.....	1
Position RCS.....	1
Position PLS.....	1
Position Launch...	8
Position PTS.....	6
Position DAS.....	1

[ESC-Exit] [↑↓-Arrows] [Pg-Up>Prev] [Pg-Dn>Next] [F8-Copy]
[F2-Add] [F3-GoTo] [F6-X/Y Cord] [F7-Registr] [F9-Layout] [← to Edit]

Figure 21. Positions maintenance.

When the system components (including the PTS) have been emplaced they are position-located in coordinates (i.e., registered using the PLS laser). These data are entered over the preliminary data and become RTS setup parameters. Once the proper coordinates are entered, these remain constant unless the components are moved and re-registered. Typically, the position parameters are entered only once, unless the user wishes to change the configuration, or move the RTS to a new location. The most common exception is when the weapon type employed changes. The weapon code number must be changed to reflect the current weapon so that the appropriate databases are activated. This is done using the DAS Positions option (see Figure 22).

02/26/92
RTS Scenario Generator
RTS Position Maintenance
10:46:27 am

Links	
0	None
1	RF
2	Cable

Manning	
0	Auto
1	Manned

[F3] Delete

DAS.....	100
Station.....	1
Weapon Code..	3
PTL.....	180
[X].....	0
[Y].....	0
[Z].....	0
Manned.....	1
Link.....	2

In Use

Position Constants	
Position Number..	1
Position REG.....	1
Position RCS.....	1
Position PLS.....	1
Position Launch..	8
Position PPTS.....	6
Position DAS.....	1

3 Stinger Basic M

[ESC-Exit] [Pg-Up>Prev] [Pg-Dn>Next] [↑↓-Arrows] [←] Edit

Figure 22. Positions maintenance (DAS option).

To plan a layout, first assign the DAS a position and a primary target line (PTL); all other component locations are based on that position (i.e., the weapon location). Typically, the DAS X and Y coordinates are 0,0 respectively, and the PTL is 180 degrees. The PLS and RCS can also be located at 0,0 coordinates to make things simpler. Then select the other components (e.g., PTS), assign a code number, assign a range (actual, not scaled) and assign a clock azimuth. Press the <<F7>> and then <<F10>> keys to have the coordinates computed for that component.

To view the layout of PTS components in range space coordinates press the <<F9>> key while in the "Maintain Positions" menu. This enables the user to view the current range layout of PTS in a two-dimensional graphic representation, showing their relative positions on the ground (see Figure 23). Pressing the <<Print Screen>> key will generate a hardcopy of the layout. In the example (see Figure 23), there are three targets (4,5,6); the weapon position and control areas are coincident with the DAS.

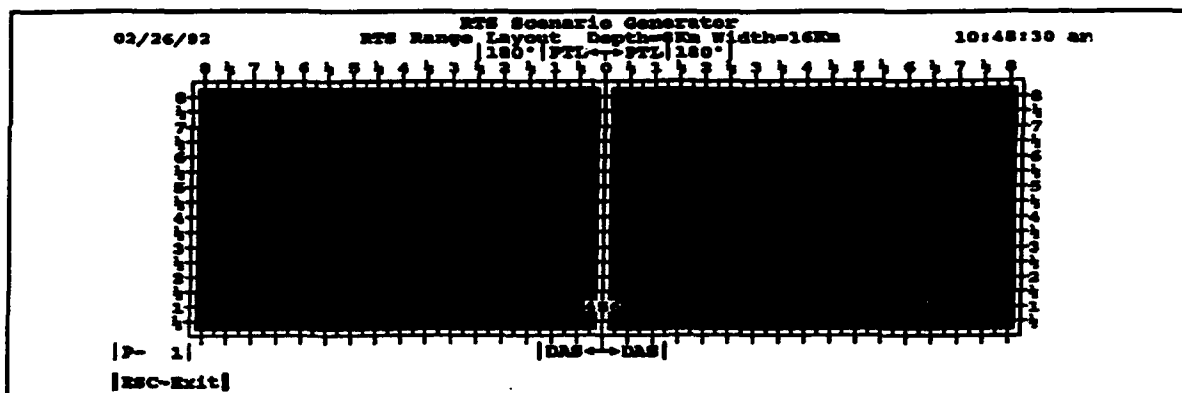


Figure 23. Range layout diagram.

RTS Tools

This is the last option in the RTS setup main menu (option "E"). This option enables the user to build sets of scenarios and print scenario listings. Selecting this option will result in the display of the tools menu (see Figure 24). Option "A" is employed to create a master database file of the existing scenarios previously developed. Use this option to update the master file whenever scenarios have been added or changed. Option "B" enables the printing of a formatted listing of all existing scenarios along with their parameters. This listing provides scenario specifications that can be used by the system operator to ensure the right scenarios are selected and administered.

Option "C" is used to build sets of scenarios to be executed during a given test. Two different sets can be developed. For example, sets of equally difficult scenarios may be required so that experimental groups or trainees do not receive exactly the same scenarios. Or one may wish to compare sets of scenarios, and so forth. The scenario sets can be printed by selecting Option "D". This will generate a formatted listing of all scenarios in the set. The system operator may use this printout as a reference when executing a set of scenarios. Each of the functions in the "Tools" menu are completely interactive, requiring no further elaboration here.

02/26/92

ITS Scenario Generator
TOOLS Main Menu

10:50:47 am

A>Generate Master List of Scenarios
B>Print Master List of Scenarios
C>Build a Sub-set of Scenarios
D>List Scenario Sub-Sets on File

ESC-EXIT

Figure 24. Tools main menu.

System Preparation and Installation

This section describes the tasks that need to be performed to prepare the system for operations. Included are Selecting a Site, Unpacking the RTS, System Cabling, System Startup and Shutdown, and System Registration.

Selecting a Site

Figure 25 depicts a typical ESX site complete with station locations, flight paths, and helicopter stand positions (this site is similar to the sites used during RTS validation). The range area can be anywhere from 1 to 4 kilometers (km) square, depending on the terrain in which it is to be employed and user requirements. For example, a larger range space would be recommended for flat (desert or tundra) terrain, and a smaller range space for dense (forest or jungle) terrain. As shown in Figure 25, 1/5 scale PTS target presentations generally take place within one km of the weapon. FTS targets can be launched from anywhere on the range, and flown according to any desired pattern.

Providing sufficient intervisibility among critical components while allowing for range monitoring and control are major considerations for site selection. The site should afford the emplacement of a weapon position and an assignable search sector, in which terrain and foliage do not visually obscure flying target flight paths or pop-up helicopter presentations. The position location system should be able to maintain line-of-sight with the flying target launch area. Pop-up helicopter targets should be out of sight when in the down position (i.e., should emerge from some terrain mask when presented). Target background terrain should not vary randomly between mountain and sky. The validity of this has been established empirically on numerous occasions (Johnson, Barber, & Lockhart, 1988). A range allowing the experimental control of target background contrast may be considered.

Position-location decisions meeting terrain and component intervisibility requirements should be made before emplacing the system. A terrain map of the range area comes in handy when selecting a site, and choosing target and weapon locations. Major RTS components can be positioned according to map locations when registration is performed. RTS coordinates can be plotted on a terrain map for additional help in determining suitable exercise areas and component locations. RTS coordinates can even coincide with map coordinates if this cross-reference is desired.

Choose a site free of electrical telephone lines, or other lofty obstructions as they are a hazard to maneuvering aircraft. The aircraft are usually flown at altitudes less than 500 feet. The RTS requires certain radio frequencies for the control of aircraft, data link communications, and range command, control and communications. The following radio frequencies should be authorized for the site selected (i.e., the site selected should be free of interference on these frequencies).

Portable Radio Net Frequency: 145.150 Mhz
 Aircraft Control Frequency: 72.550 Mhz
 Target Data Link Frequency: 72.020 Mhz

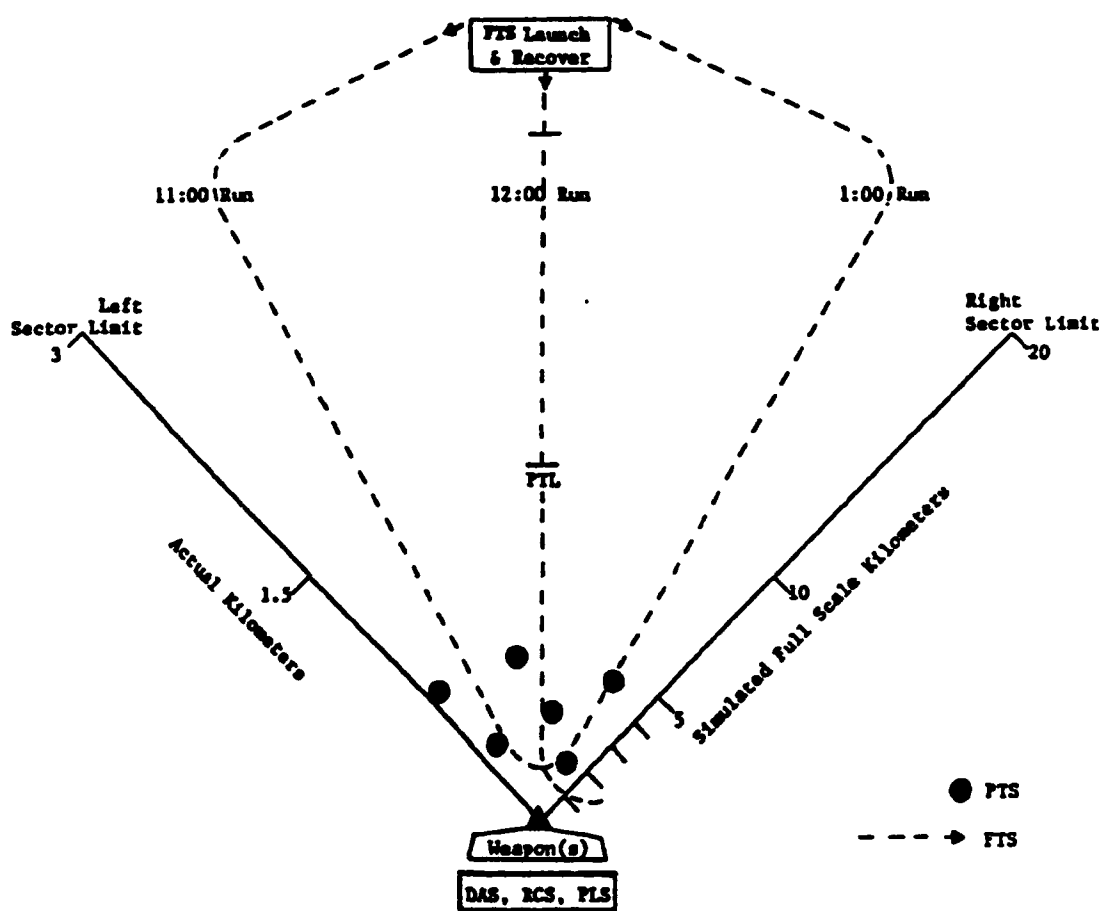


Figure 25. RTS range layout.

If the application requires the live fire of gun systems, there are a few additional concerns for site selection. Range communications and control, range servicing, and engineering support requirements are major considerations. Authorized live fire range selection, range scheduling, and range clearance (frequencies, airspace, etc.) should be planned well in advance. Further, protective berms (sand dunes, etc.) are advised to enable the pop-up target systems to be used repeatedly, without suffering extensive damage.

Once a site has been selected, the RTS can be configured for operations.

Unpacking the RTS

The RCS, PLS, generators, tools, test equipment, repair parts, and all DAS are stowed and transported in the RTS Transport Trailer. The Transport Trailer also serves as the base of RTS operations and requires positioning for emplacing the RTS system. Prior to positioning the transport trailer, unload all DAS, one generator, and supporting equipment (i.e., antennas, cables, etc.) in the proximity of the weapon positions. The DAS will be emplaced and configured later.

1. **Position the transport trailer.** The trailer should be positioned so the camera and laser have an unobstructed field of view to aerial targets, target launch points, and weapon system positions. Once a location has been determined, move the trailer in position, lower the stabilizing jacks, course level the trailer, and then perform the following:
2. **Unload the RCS and PLS generators.** Position the generators on the road side, front of the transport trailer.
3. **Unload the pan-tilt support assembly.** Position the pan tilt support assembly on the top front of the trailer. Secure the pan-tilt support assembly with the supplied hardware.
4. **Unload the pan-tilt.** Position the pan-tilt on the pan-tilt support assembly. Secure the pan-tilt with the supplied hardware.
5. **Unload the PLS laser.** Position the laser on the pan-tilt. Secure the PLS laser with the supplied hardware.
6. **Unload the PLS camera.** Position the pan-tilt on the pan-tilt support assembly. Secure the PLS camera with the supplied hardware.
7. **Gain access to the RCS and PLS.** Remove the tie down strap and front covers. Stow the RCS and PLS front covers on the shelves at the rear of the transport trailer.

8. Level the trailer using the level provided in the tool kit. Place level on the pan-tilt mounting pedestal and observe the bubble. The level should be checked and adjusted both side to side and front to back of the trailer. Adjust the level as needed by raising or lowering the stabilizing jacks.

9. Unpack and emplace DAS. Move to the location the DAS were unloaded. The DAS can be emplaced anywhere from 10 to 30 feet from the weapon system to which it is to be connected. However, it is advisable that the DAS operator have visual contact with the exercising troops. Configure the DAS by performing the following:

a. Each DAS has two rack and stack cases. Position the larger case so that the operator or instructor has adequate access for operation.

b. Open the front cover of the larger case (flip-down keyboard). Then open the top cover to gain access to the antenna and power cords. Remove the antenna and power cords and install. Close the top cover and secure it.

c. Place the small DAS case on the top of large case. Remove the front cover of the small case to gain access to the monitor, video cable and power cord. Stow the front cover on top of the small case. Connect the video cable and power cord to the front of the DAS.

10. Unpack and emplace the PTS. Refer to the Range Target System (RTS) Operations Manual, Annex 1: Pop-Up Target System (PTS) Operations and Maintenance Reference Manual for instructions and procedures.

11. Unpack and emplace the FTS. Refer to the Range Target System (RTS) Operations Manual, Annex 2: Flying Target System (FTS) Operations and Maintenance Reference Manual for instructions and procedures.

System Cabling

Configuring the system. Refer to system cabling diagram (see Figure 26) and to vendor manuals (see Page 90, Related User Documents) when performing the following procedures.

1. Computer Component Interconnections. All computer components are directly cabled together and to peripheral devices (including the weapons). Computers and other peripherals (printer, camera, battery charger, AC adaptor, etc.) plug into the power strip. Connect the RCS modem and power amplifier.

2. Connecting PLS Cables. Plug in the three laser cables and screw on their cable collars: laser, power supply, and control unit (see Figure 27). Ensure that the cables are not twisted or strained, and that there is sufficient slack to allow the PLS to rotate freely to the limits of its orientation circle. Connect the laser control unit to the laser computer, the laser computer to the PLS computer, and the laser trigger assembly to the pan-tilt console.

3. Connecting the Power. At the weapon system location connect one 115 Volt power generator to the DAS. At the Transport Trailer connect one 115 Volt power generator to the RCS-PLS UPS and another 115 Volt power generator to the laser power supply.

4. Connecting the Laser Ballistics Simulator. This procedure is similar to the connecting of the PLS (see Figure 28). Both use the laser, laser power supply, laser computer, and laser control unit.

5. Connecting the PTS. Refer to the Range Target System (RTS) Operations Manual, Annex 1: Pop-Up Target System (PTS) Operations and Maintenance Reference Manual for instructions and procedures.

6. Connecting the FTS. Refer to the Range Target System (RTS) Operations Manual, Annex 2: Flying Target System (FTS) Operations and Maintenance Reference Manual for instructions and procedures.

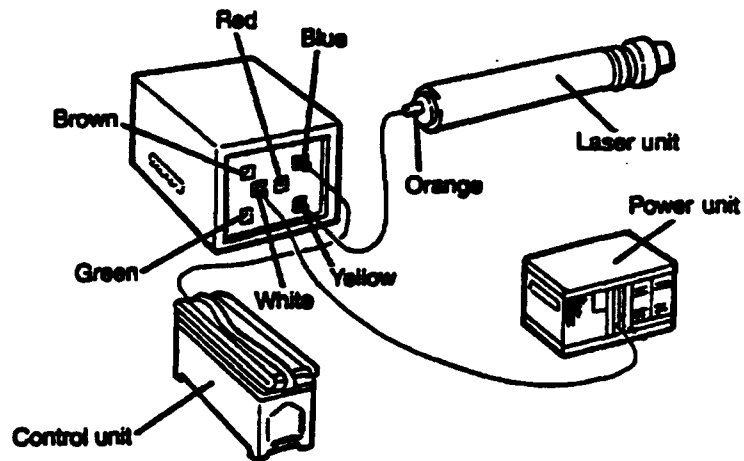


Figure 27. PLS cabling diagram.

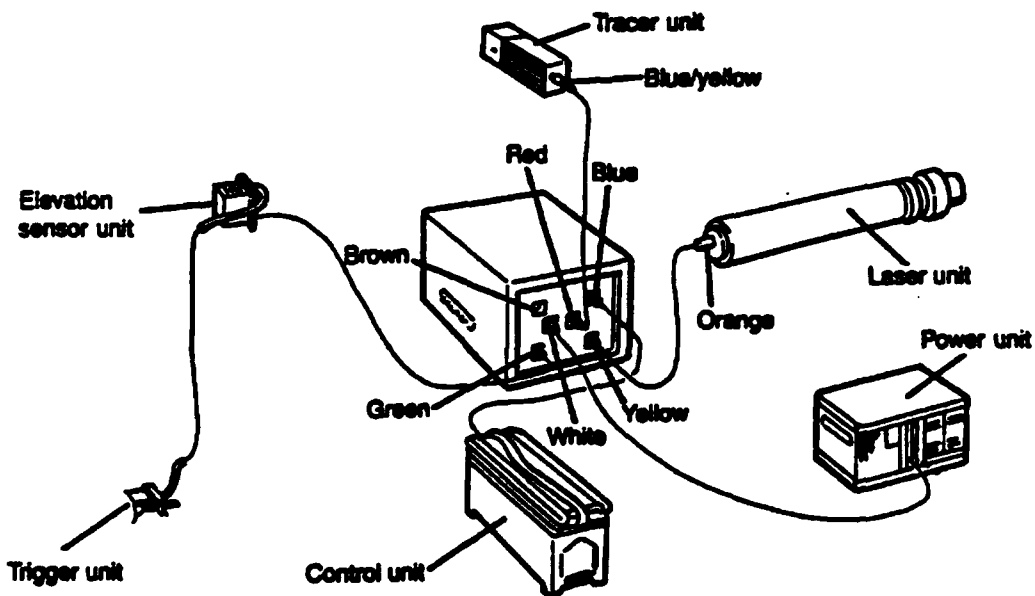


Figure 28. LBS cabling diagram.

System Startup and Shutdown

The following procedures are performed in sequence to apply power to the system. Perform these procedure in reverse order to remove power form the system. Refer to the manufactures and vendor manuals (see Page 90, Related User Documents) as needed.

1. Energize the system generators. First ensure that the generator has sufficient oil and gasoline and check filters. Insert the ignition key and turn switch to "ON" (refer to Figure 29). After about ten seconds, switch to "Start," release the key when the generator starts. The generator will need to run for a minute or so to warm up. Once it is running smoothly (evidenced by a change in noise level), turn on the output circuit breaker.

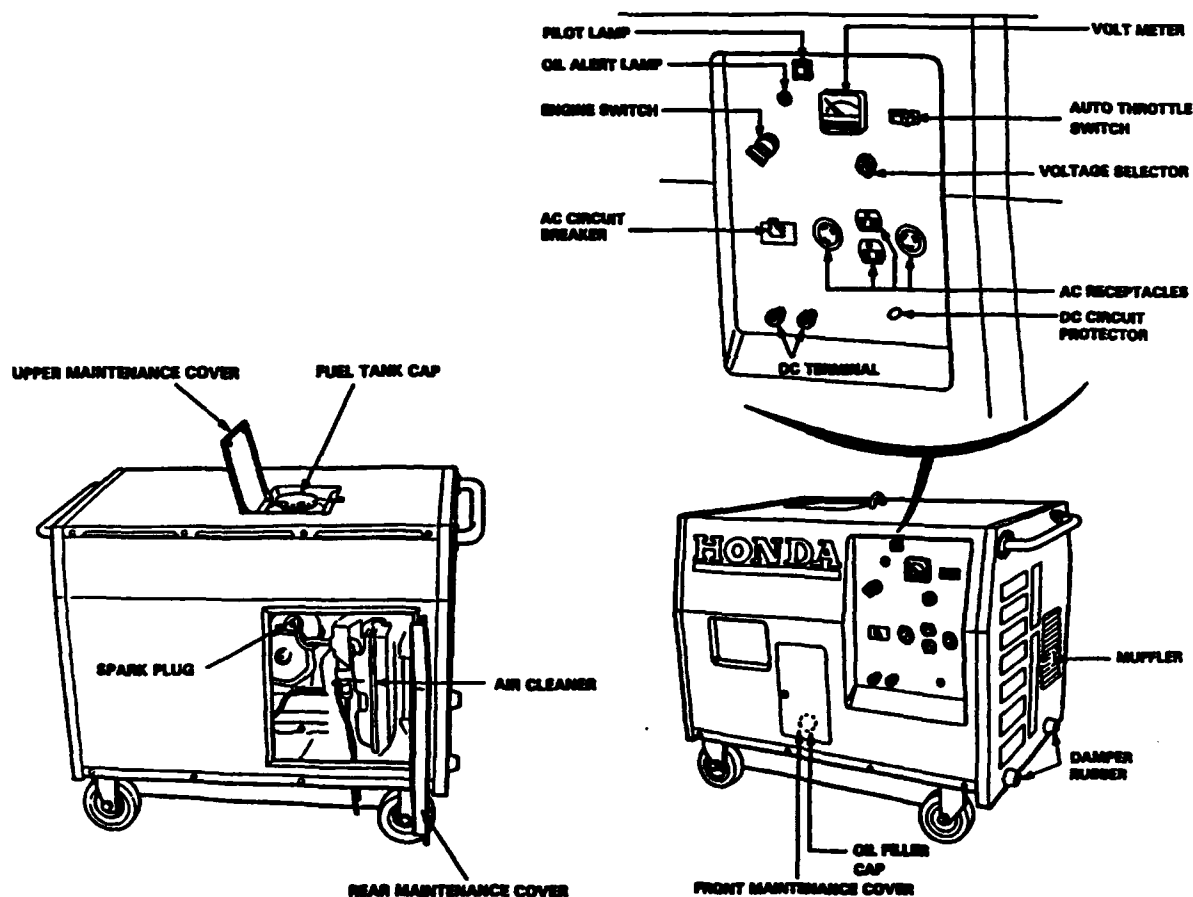


Figure 29. Generator control console.

2. Activate system stations. Apply power to the RCS and PLS. Turn the UPS power ON-OFF switch to the "ON" position. This will provide power to the RCS-PLS (only one switch, at front and center). The RCS and PLS will automatically "Boot-up", displaying the DOS prompt (C:\).

b. Apply power to the PLS pan-tilt control panel. Place the "TEST-OPERATE" toggle switches on the Pan-Tilt control panel to the "TEST" position (refer to Figure 30).

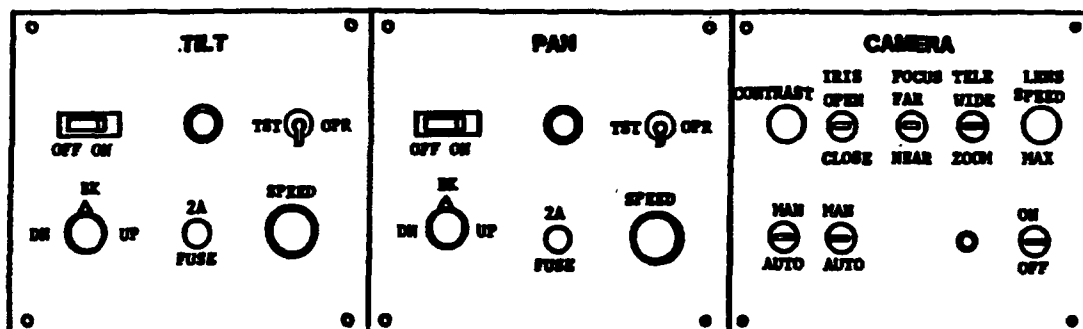


Figure 30. Pan tilt & camera controls.



Applying power with the "TEST-OPERATE" toggle switches on the Pan-Tilt control panel in the "OPERATE" position could cause injury to personnel and damage the equipment.

Energize the "Tilt" and "Pan" Consoles (move power "ON-OFF" slide switches from the "OFF" to the "ON" position). Provides for the manual adjustment of the PLS Pan Tilt and Camera: Contrast, Shutter (Iris), and Field of View, Zoom (Wide-angle or Telephoto).

c. Energize the laser control unit (PLS and LBS). Simultaneously press the right arrow and minus sign push buttons (the Laser Control Unit is de-energized by simultaneously pressing the left arrow and plus sign push buttons) (refer to Figure 31).

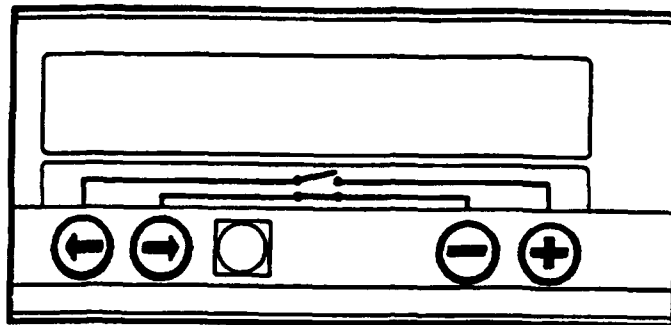


Figure 31. Laser control unit (PLS and LBS).

d. **Energize the DAS.** Switch the main power toggle switch to the "ON" position (see Figure 32). The DAS will automatically Boot Up and display the RTS main menu (see Figure 8).

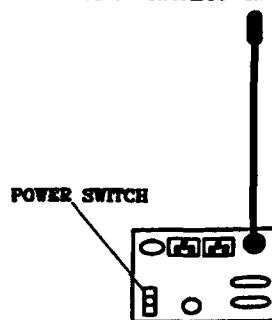


Figure 32. DAS main power switch.

e. **Energize the PTS.** Refer to the Range Target System (RTS) Operations Manual, Annex 1: Pop-Up Target System (PTS) Operations and Maintenance Manual for power up and power down procedures.

f. **Energize the FTS.** Refer to the Range Target System (RTS) Operations Manual, Annex 2: Flying Target System (FTS) Operations and Maintenance Manual for power up and power down procedures.

System Registration

Registration of the system results in the geographic location of all major RTS components. To accomplish this, the PLS station is used as a site survey device.

Preliminary coordinates for various components should be derived before conducting registration. This is done by inputting desired ranges and azimuths of these components, as referenced from the center of the firing fan (point zero), into the RTSETUP program. These coordinates can be compared to those obtained during registration to determine the degree to which position-location of equipment meets requirements. Refer to RTSETUP Section ("Maintain Positions Menu") for more information on establishing preliminary coordinates using the RTSETUP program.

Voice communications are required at the PLS to communicate with a spotter down range. The spotter will travel to the various positions that must be registered. The spotter should have a laser retro-reflector attached to a long pole. The spotter will place a survey-registration marker or stake in the ground at each location to eliminate confusion as to where to emplace the equipment.

1. **Establish the PLS location.** The PLS orientation circle should contain all azimuths to which the PLS will be directed (e.g., all flight paths, all launch points, all PTS, and all RTS stations). The center points of the circle are typically 0 or 180 degrees and can correspond to the PTL of the firing fan. The minimum effective range of the PLS is 75 meters. Any RTS component being registered which is closer must be surveyed manually (easily derived given the coordinates of the PLS and components beyond the 75 meter limit).

Once the PLS position has been established, a Registration Station (REG) station can be registered. The REG station is that reference point for all other components.

NOTE

If there will be more than one weapon position, the station called "REG" will establish the point of reference for all other weapon locations.)

It is a good practice to position the PLS, RCS, and REG at the same location. Typically, the REG position is given the default values "0,0" for the X and Y coordinates, and "180" as the orientation (i.e., referred to as down range, or the weapon PTL). All subsequent component locations will be registered in terms of their deviation from point zero (the REG). If the PLS is at a different location than the REG, it will generally have a negative Y coordinate (i.e., located behind the REG and the weapon crew's search sector).

NOTE

If the REG location is different from the RCS and PLS, perform Steps 2 and 3.

2. Register the REG. Begin registration by selecting the "Test" option from the RCS Main Menu. This is done by positioning the highlighter over that option using the arrow keys and pressing <<ENTER>>. Then select the "PLS" sub-option using the same procedure. The PLS will determine the new RTS coordinates whenever it is aligned with a laser retro-reflector. These coordinates will be displayed at the RCS and should be manually recorded on paper to be input at a later time into the RTSETUP program.

To register the REG station contact the spotter on the radio and request that the laser retro-reflector pole be raised. Align the laser with the retro-reflector using the trackball. Alignment can be confirmed by viewing the camera display screen. Once aligned, the RCS will display the current coordinates, indicating the position relative to the REG.

3. Register additional components. Repeat step 2 of this procedure to register additional stations or components (i.e., DAS, PTS, and FTS launch locations).

Range Target System (RTS) Operations

The following section discusses the operations required to use RTS. This section includes an overview of the software, RCS Operations, PLS Operations, DAS Operations, PTS Operations, and FTS Operations.

Software Overview

The RTS software system is made up of a combination of programs, batch files, and utilities. The following list makes up the RTS software system.

RCS.EXE	-	Resides on and runs the RCS
DAS.EXE	-	Resides on and runs each DAS
PLS.EXE	-	Resides on and runs the PLS
PTS.BAS	-	Resides on and runs each PTS
RTSETUP.EXE	-	Resides on the RCS, sets up required RTS data files
OFFLOAD.BAT	-	Resides on the RCS, used to offload data files
DBIII.EXE	-	Resides on the RCS, required to run scoring
CHAPRPT.PRГ	-	Resides on the RCS, part of scoring system
RTSCORE.PRГ	-	Resides on the RCS, part of scoring system
RTSMNCAL.PRГ	-	Resides on the RCS, part of scoring system
RTSPMCAL.PRГ	-	Resides on the RCS, part of scoring system
RTSRPT.PRГ	-	Resides on the RCS, part of scoring system
RTSTMDIF.PRГ	-	Resides on the RCS, part of scoring system
STNGRPT.PRГ	-	Resides on the RCS, part of scoring system
TPSPMFAU.PRГ	-	Resides on the RCS, part of scoring system
VLCRPT.PRГ	-	Resides on the RCS, part of scoring system

RTS menu system. RTS provides an extensive set of screens, menus, data windows, and prompts that give the operator control over the RTS software system. These screen components are collectively known as a menu system. The menu system is the operator interface to the RTS software system.

Types of cursors. The menu system uses two types of cursors, a flashing "_" and a "highlighter." See the following explanations.

a. **Prompted input.** Uses the flashing "_" as the cursor. This is a request to input information or data into the RTS software system.

b. **Highlighter.** Uses reverse video as the cursor. This is used to highlight menu options for selection.

The menu is presented in the form of bars (see Figure 33).

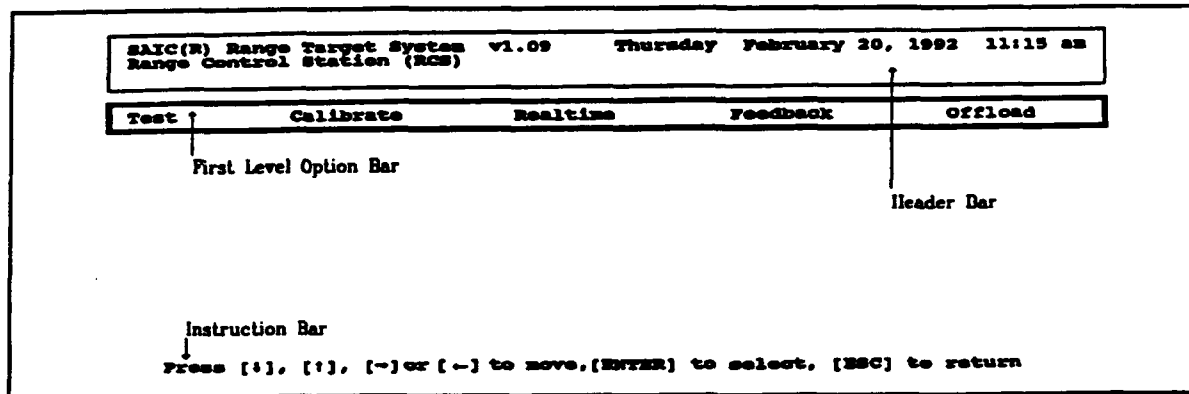


Figure 33. Menu description and instruction.

Header bar. This area of the menu provides the operator with information (i.e., software system name and version; current day, date and time; and tlx RTS station name).

First level option bar. This area of the menu provides the operator with the options required to run the RTS software system. Each option has several sub-menus that are completely operator interactive.

Instruction bar. This area of the menu provides the operator with the instructions needed to interact with the RTS software system. The following list describes the instructions used.

Down Arrow	-	Used to move the cursor down
Up Arrow	-	Used to move the cursor up
Right Arrow	-	Used to move the cursor right
Left Arrow	-	Used to move the cursor left
ENTER	-	Used to select a highlighted option; used to accept a prompted input
ESC	-	Used to move from a lower level menu (sub-menu) to a higher level menu; used to Exit RTS system software
WAIT	-	Used to tell the operator to wait while software operations are being performed

Menu Examples

The following examples demonstrate the procedures needed to operate the RTS menu system.

Move between menus. To move from the main menu to lower level menus, the operator uses the arrow keys to highlight the desired menu option. The operator then presses the <<ENTER>> key to select the highlighted option. To move from the lower level menu (there can be multiple lower level menus) back to the main menu, the operator presses the <<ESC>> key. The <<ESC>> key must be pressed once for each level of menu that the operator wishes to move back from (see Figure 34 through 36).

Shown below is an example of moving from the main menu to sub menus.

SAGECRO Range Target System v1.00		Thursday February 20, 1992 11:15 am	
Range Control Position (RM)			
Turn	Calibrate	Realtime	Feedback
			Offload

Press [1], [2], [3] or [4] to move, [ENTER] to select, [ESC] to return

To move from the main menu (1st level, above) to the sub menu (2nd level, below), highlight the desired option then press <<ENTER>> to accept.

KSC(R) Range Target System v1.00 Running February 26, 1983 11:13 AM Range Control Station (RCS)				
Test	Calibrate	Realtime	Feedback	STYLoad
Run JMS				

Press [0], [1], [-] or [=] to move, [ENTER] to select, [ESC] to return

To move from the sub menu (2nd level, above) to the sub menu (3rd level, below), highlight the desired option then press <<ENTER>> to accept.

[illegible]

Figure 34. Main menu to sub menus

Shown below is an example of moving from sub menus to the main menu.

SASC(R) Range Target System v1.00 Thursday February 20, 1992 11:15 am Range Control Station (RCS)				
Test	Calibrate	Realtime	Feedback	Offload
F20 F21 F22 F23 F24 F25 F26 F27 F28 F29				
Press (F1) or (F2) to move, (ENTER) to select, (ESC) to return				

To move from the sub menu (3rd level, above) to the sub menu (2nd level, below), press <<ESC>> once.

SASC(R) Range Target System v1.00 Thursday February 20, 1992 11:15 am Range Control Station (RCS)				
Test	Calibrate	Realtime	Feedback	Offload
F20 F21				
Press (F1), (F2), (-) or (.) to move, (ENTER) to select, (ESC) to return				

To move from the sub menu (2nd level, above) to the main menu (1st level, below), press <<ESC>> once.

SASC(R) Range Target System v1.00 Thursday February 20, 1992 11:15 am Range Control Station (RCS)				
Test	Calibrate	Realtime	Feedback	Offload
F20 F21				
Press (F1), (F2), (-) or (.) to move, (ENTER) to select, (ESC) to return				

Figure 35. Sub menus to main menu

Exit RTS. To exit RTS, the system software must be at the main menu. The operator presses the <<ESC>> key. This will display the "Exit RTS" prompt (see Figure 36). The "Yes" option is automatically highlighted, but the operator can use the arrow keys to highlight the "No" option if desired. With the "Yes" option highlighted, the operator presses the <<ENTER>> key to accept the option. The RTS system software will terminate and the system will return to the operating system prompt (C:\RTS). If the operator does not wish to terminate the RTS software, the "No" option must be highlighted. The operator presses the <<ENTER>> key to accept the option. The RTS system software will return to the main menu.

SAIC(R) Range Target System v1.09		Thursday February 20, 1992 2:38 pm		
Range Control Station (RCS)				
Test	Calibrate	Realtime	Feedback	Offload

Exit RTS
No
Yes

Press [↑] or [↓] to move, [ENTER] to select, [ESC] to return

Figure 36. Exit RTS prompt.

Range Control Station (RCS) Operations

Once the RCS is energized, the RCS Main Menu will appear (see Figure 37). The main menu can also be activated by typing "RCS" after the operating system prompt (C:\RTS with flashing "_"). The option "Test" will be highlighted initially, but any option can be selected by moving the highlighter with the arrow keys.

SAIC(R) Range Target System v1.09 Thursday February 20, 1992 11:15 am Range Control Station (RCS)				
Test	Calibrate	Realtime	Feedback	Offload

Press [↑], [↓], [←] or [→] to move, [ENTER] to select, [ESC] to return

Figure 37. RCS main menu.

Select "Test." The "Test" option has two suboptions: "PTS" (Pop-up Target System test) and "PLS" (Position-Location System test) (see Figure 38).

SAIC(R) Range Target System v1.09 Thursday February 20, 1992 11:18 am Range Control Station (RCS)				
Test	Calibrate	Realtime	Feedback	Offload

PTS PLS

Press [↑], [↓], [←] or [→] to move, [ENTER] to select, [ESC] to return

Figure 38. Test menu.

NOTE

The PTS must be operational and in remote prior to performing the PTS Test.
Refer to the Range Target System (RTS) Operations Manual, Annex 1:
Pop-Up Target System (PTS) Operations and Maintenance Manual.

Select PTS. Select the "PTS" option to display the PTS Selection Menu (see Figure 39). The PTS numbers (1 through n) are associated with the current system configuration.

SAIC(R) Range Target System v1.09 Thursday February 20, 1992 11:19 am Range Control Station (RCS)					
Test	Calibrate	Realtime	Feedback	Offload	
PTS PLS					
PTS					
1					
2					
3					
7					
8					
9					
Press [←] or [→] to move, [ENTER] to select, [ESC] to return					

Figure 39. PTS selection menu.



Ensure personnel are clear of the PTS you are about to test.
Failure to do so may result in injury to personnel.

NOTE

Each PTS should be tested to ensure operability.

Select PTS number. Highlight the PTS number you desire to test. Press <<ENTER>> to select the PTS number. When the PTS is under the control of the RCS, the PTS Commands Menu will appear (see Figure 40).

SAIC(R) Range Target System v1.09 Thursday February 20, 1992 11:24 am Range Control Station (RCS)				
Test Calibrate Realtime Feedback Offload				
PTS PLS PTS 1 2 3 4 5 6 7 8 9	PTS 9 Commands Stop Up (Raise target) Down (Lower target) Rotate CW Rotate CCW Orient Smoke Status Request			
Press [↑] or [↓] to move, [ENTER] to select, [ESC] to return				

Figure 40. PTS commands menu.

NOTE

You can observe the result of each function test by positioning the laser and camera at the PTS under test.

The following PTS Commands can be selected in any order the operator desires.

Select "Stop." This command terminates any active command.

Select "Up." This command raises the PTS.

Select "Down." This command lowers the PTS.

Select "Rotate CW." This command rotates the PTS mast clockwise.

Select "Rotate CCW." This command rotates the PTS mast counter clockwise.

Select "Orient." This command prompts the operator for an orientation value (see Figure 41).

SAIC(R) Range Target System v1.09 Thursday February 20, 1992 11:43 am Range Control Station (RCS)				
Test Calibrate Realtime Feedback Offload				
PTS PLS PTS 1 2 3 4 5 6 7 8 9	PTS 9 Commands Stop Up (Raise target) Down (Lower target) Rotate CW Rotate CCW Orient Smoke Status Request			
		Enter desired orientation:		
Press [ENTER] to continue, [ESC] to cancel				

Figure 41. Orientation prompt.

Enter orientation desired. Enter the desired orientation in degrees, press <<ENTER>> to accept. This will position the PTS mast to the desired orientation. Once the mast has moved to the requested orientation a PTS Status window is displayed (see Figure 42).

SAIC(R) Range Target System v1.09		Thursday February 20, 1992 11:43 am	
Range Control Station (RCS)			
Test	Calibrate	Realtime	Feedback
Offload			
PTS PLS			
PTS	PTS 9 Commands	PTS 9 Status	
1	Stop	Target type: Unknown	
2	Up (Raise target)	Orientation: 177°	
3	Down (Lower target)	Pressure: OK	
4	Rotate CW	Unmask Delay: 4 s	
5	Rotate CCW	Raise Delay: 9 s	
6	Orient	Mask Delay: 21 s	
7	Smoke		
8	Status Request		
9			
Press [ESC] to continue			

Figure 42. Orientation status.

Select "Smoke." This command causes the PTS to generate Smoke.

NOTE

The Smoke option is not implemented on all PTS.
The Smoke command will automatically terminate after five seconds.
It will take longer for the actual smoke to dissipate.

Select "Status Request." This command displays a PTS Status window (see Figure 43). The window provides information about the PTS.

SAIC(R) Range Target System v1.09		Thursday February 20, 1992 11:45 am	
Range Control Station (RCS)			
Test	Calibrate	Realtime	Feedback
Offload			
PTS PLS			
PTS	PTS 9 Commands	PTS 9 Status	
1	Stop	Target type: Unknown	
2	Up (Raise target)	Orientation: 175°	
3	Down (Lower target)	Pressure: OK	
4	Rotate CW	Unmask Delay: 4 s	
5	Rotate CCW	Raise Delay: 9 s	
6	Orient	Mask Delay: 21 s	
7	Smoke		
8	Status Request		
9			
Press [ESC] to continue			

Figure 43. Status request.

Repeat procedures for all PTS to be tested.

Select "PLS." This option is for testing the functions of the laser tracking system. Selection of this option displays the PLS Commands Menu (see Figure 44).

SAIC(R) Range Target System v1.09		Monday February 24, 1992 10:09 am	
Range Control Station (RCS)			
Test	Calibrate	Realtime	Feedback
PTS PLS			

PLS 1 Commands
Track
Orient
Status Request

Press [↑] or [↓] to move, [ENTER] to select, [ESC] to return

Figure 44. PLS commands menu.



Ensure all personnel are clear of the laser and camera area (roof of the transport trailer).

Failure to do so may result in injury to personnel.

NOTE

A retro-reflector should be mounted on one of the raised PTS or at some other known location down range (e.g., launch site).

Select "Track." This option displays the track data associated with the current orientation of the laser (see Figure 45).

SAIC(R) Range Target System v1.09		Monday February 24, 1992 10:09 am	
Range Control Station (RCS)			
Test	Calibrate	Realtime	Feedback
PTS PLS			

PLS 1 Commands
Track
Orient
Status Request

Position Location Station #1	
Time:	10.32
PL Time:	9.17
X:	81
Y:	-1109
Z:	771

Press [ESC] to exit

Figure 45. PLS track window.

Select "Orient." This option will prompt the operator for an orientation position number (see Figure 46). The orientation position number is typically associated with a launch and recovery area for flying targets.



Ensure all personnel are clear of the roof of the transport trailer.
Failure to do so may result in injury to personnel.

Press <<ENTER>> to accept position number. This will cause the laser to position to the desired location.

SAIC(R) Range Target System v1.09 Range Control Station (RCS)		Monday February 24, 1992 10:11 am	
Test Calibrate Realtime Feedback Offload			
PTS PLS PLS 1 Commands Track Orient Status Request PLS 1 Status Azimuth: 171° Elevation: 31° Press [ESC] to continue			

Figure 46. Launch position number.

Status. This option displays the current azimuth and elevation of the laser on the right of the screen (see Figure 47).

SAIC(R) Range Target System v1.09 Range Control Station (RCS)		Monday February 24, 1992 10:11 am	
Test Calibrate Realtime Feedback Offload			
PTS PLS PLS 1 Commands Track Orient Status Request PLS 1 Status Azimuth: 171° Elevation: 31° Press [ESC] to continue			

Figure 47. PLS status window.

Select "Calibrate." Return to the RTS Main Menu and select the "Calibrate" option to display the PTS Selection Menu (see Figure 48). This procedure is best accomplished at the DAS closest to the REG position. Refer to DAS procedures operations.

SAIC(R) Range Target System v1.09		Thursday February 20, 1993 11:48 am		
Range Control Station (RCS)				
Test	Calibrate	Realtime	Feedback	Offload
	PTS			

Press [↑], [↓], [←] or [→] to move, [ENTER] to select, [ESC] to return

Figure 48. Calibration menu.

NOTE

Each PTS must be calibrated prior to it being used in any training or test application.

The defaults which appear initially are not accurate.

Each PTS should be calibrated three or four times when the system is initially emplaced.

Calibrate will not need to be performed again unless the PTS is moved to another location or the target type mounted on the PTS has changed.

Select "Realtime." At the RCS, with the system in RTS Main Menu, select Realtime. Selection of Realtime will display the Select Scenario menu (see Figure 49). Press <<ENTER>> to select. This will cause the system to prompt the operator to enter a scenario number (see Figure 50).

SAIC(R) Range Target System v1.09 Thursday February 20, 1992 11:52 am Range Control Station (RCS)				
Test	Calibrate	Realtime	Feedback	Offload
Select scenario				

Press [i], [j], [-] or [=] to move, [ENTER] to select, [ESC] to return

Figure 49. Select scenario menu.

SAIC(R) Range Target System v1.09 Thursday February 20, 1992 11:53 am Range Control Station (RCS)				
Test	Calibrate	Realtime	Feedback	Offload
Select scenario				
Enter scenario number:				

Press [ENTER] to continue, [ESC] to cancel

Figure 50. Select scenario prompt.

Enter scenario number. Enter the scenario number to be run. Press <<ENTER>> to accept. Information about the selected scenario will be displayed in the Scenario Parameters window (see Figure 51).

SAIC(R) Range Target System v1.09 Thursday February 20, 1992 11:54 am Range Control Station (RCS)																																		
Test Calibrate Realtime Feedback Offload Scenario 17 Parameters <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">DIFFICULTY</td> <td style="width: 15%;">PTS</td> <td style="width: 15%;">PTS</td> <td style="width: 20%;">GUNTABLE</td> <td style="width: 30%;">TERRAIN</td> </tr> <tr> <td>Low</td> <td>1</td> <td>0</td> <td>0</td> <td>Sky</td> </tr> <tr> <td>AD WARNING</td> <td>WCS</td> <td>TALENT</td> <td>TCUE</td> <td>CUE</td> </tr> <tr> <td>Red</td> <td>Tight</td> <td>0</td> <td>0</td> <td>None</td> </tr> <tr> <td>PTS</td> <td>MODEL</td> <td>STD</td> <td>RAISE</td> <td>DURATION</td> </tr> <tr> <td>1</td> <td>UM-1</td> <td>None</td> <td>20</td> <td>30</td> </tr> </table>					DIFFICULTY	PTS	PTS	GUNTABLE	TERRAIN	Low	1	0	0	Sky	AD WARNING	WCS	TALENT	TCUE	CUE	Red	Tight	0	0	None	PTS	MODEL	STD	RAISE	DURATION	1	UM-1	None	20	30
DIFFICULTY	PTS	PTS	GUNTABLE	TERRAIN																														
Low	1	0	0	Sky																														
AD WARNING	WCS	TALENT	TCUE	CUE																														
Red	Tight	0	0	None																														
PTS	MODEL	STD	RAISE	DURATION																														
1	UM-1	None	20	30																														
Press [h] or [i] to view, [ENTER] to continue, [ESC] to cancel																																		

Figure 51. Scenario parameters.

NOTE

If the operator selects scenarios that have PTS targets only, the system will skip "Enter FTS Scale" and "Enter FTS Launch Number" and continue at "Accept Scenario Setup."

If the operator selects scenarios that have both PTS and FTS or FTS only, the system will continue with "Enter FTS Scale."

All DAS should be in RTS Main Menu to receive scenario downloads. If you proceed and any of the DAS are not in the main menu, the system will prompt the RCS operator to bypass or abort the operation.

If the information is incorrect or you do not wish to run the selected scenario, press <<ESC>> to abort this operation, then return to "Enter Scenario Number."

Scenario download. View the Scenario parameters as needed then press <<ENTER>> to continue. Once the operator presses <<ENTER>> at the Scenario Parameters window the system will establish data communications with the PLS (if required, see NOTE above) and with each DAS and PTS. The system will transmit scenario pertinent data to the stations. This data transmission is referred to as Scenario Download.

NOTE

If the PLS is required the following prompts will be displayed.

If the PLS is not required, proceed to "Verify Setup" and continue.

Enter target scale. Once the operator accepts the Scenario Setup, the system will display a prompt to accept or change the FTS scale (see Figure 52).

SAIC(R) Range Target System v1.09		Monday February 24, 1992 3:06 pm	
Range Control Station (RCS)			
Test	Calibrate	Realtime	Feedback
Offload			
Scenario 33 Download			
Position Location Station #1			
Enter FTS #1 scale: 5			
Press [ENTER] to continue, [ESC] to cancel			

Figure 52. FTS scale prompt.

NOTE

RTS supports 1/9th, 1/7th, and 1/5th scale targets (the default is 1/5th).

Enter launch number. Once the scale is entered, press <<ENTER>> to accept. This will cause the system to prompt the operator to enter the FTS Launch Number (see Figure 53). The launch number is the location of the current launch point.

SAIC(R) Range Target System v1.09		Monday February 24, 1992 3:10 pm	
Range Control Station (RCS)			
Test	Calibrate	Realtime	Feedback
Offload			
Scenario 33 Download			
Position Location Station #1			
Enter FTS #1 launch number: 1			
Press [ENTER] to continue, [ESC] to cancel			

Figure 53. Launch number prompt.

RTS supports four (4) Launch Locations (the default is 1).



Ensure all personnel are clear from the laser and camera area
(top of the transport trailer).

Failure to do so may result in injury to personnel.

Position the PLS. Once the launch number is entered press <<ENTER>> to accept. This will cause the system to establish communications with the PLS. The PLS will then position the laser and camera so that they are pointing in the direction of the selected launch location. Once the positioning is complete the system will then continue with scenario download to all stations (see Figure 54 and Figure 55).

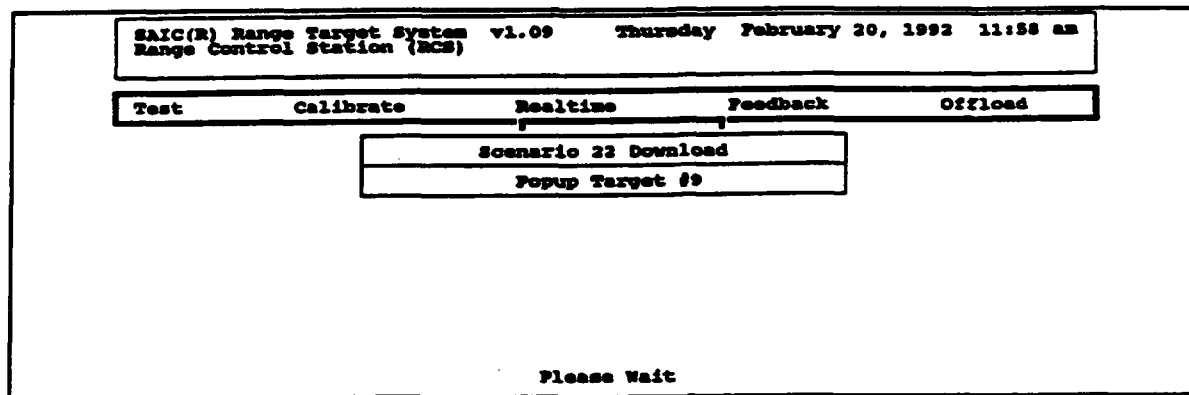


Figure 54. PTS download.

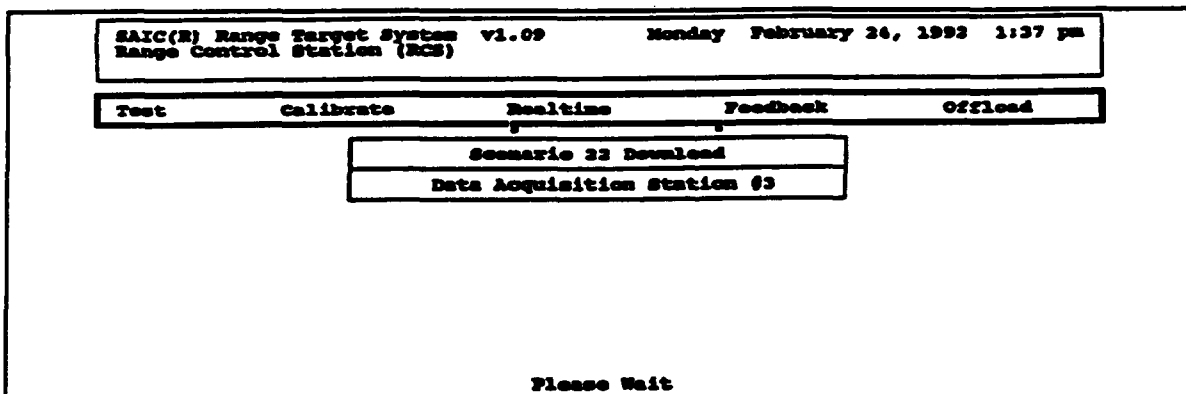


Figure 55. DAS download.

Verify scenario setup. Once all downloads are complete, the scenario setup window is displayed (see Figure 56). The RCS operator will then verify that the right crew number and repetition number are displayed with the DAS status information. The repetition number corresponds to either the first, second, or nth time the scenario has been presented to this crew, and is automatically assigned by the computer each time the scenario is executed for that crew. The first time a crew sees a scenario is the 0th repetition of that scenario. The second time a crew sees a scenario is the 1st repetition, and so on.

SAIC(R) Range Target System v1.09 Thursday February 20, 1992 11:59 am Range Control Station (RCS)					
Test	Calibrate	Realtime	Feedback	Offload	
Scenario 22 Setup					
PTS 9	MODEL (EXP) MI-8	ORIENTATION 45°	MODEL (ACT) Unknown	ORIENTATION 174°	PRESSURE OK
DAS 3	CREW 12	REP 0	SQUAD LEADER 000000000	GUNNER 000000000	WEAPON AVENGER

Press [←] or [→] to view, [ENTER] to continue, [ESC] to cancel

Figure 56. Scenario setup.

Accept scenario setup. If the information is correct, the operator presses <<ENTER>> to proceed. This will result in the display of the range fan (weapon crew's search sector), with the PTS target positions, and flying target tracking information presented (see Figure 57). If there are discrepancies that need to be fixed, pressing the <<ESC>> key will terminate this scenario initialization.

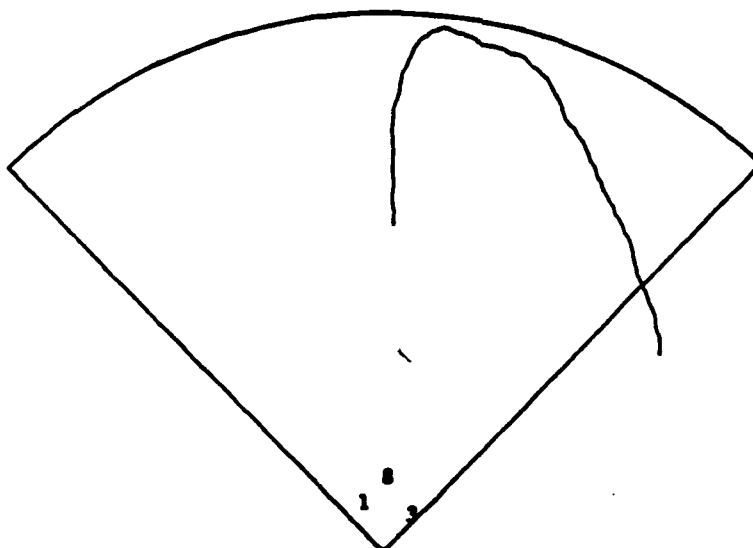


Figure 57. RCS realtime range fan display.

NOTE

If PTS only, skip to "Start the Scenario" and proceed.

Launch flying target. To launch the flying target the RCS operator instructs the launch crew to launch the target via the FTS voice radio. The RCS operator watches the camera monitor to observe the launch and ensures that the laser tracks the target. Once the laser is tracking the target the RCS informs the launch crew that he is tracking. The launch crew responds by "Roger Tracking, commencing run."

NOTE

At different times throughout the scenario the RCS operator may need to use the PLS trackball and camera monitor to aid in the tracking of flying targets.

Track and guide the flying target. The RCS operator continually observes the flight path and provides path corrections as needed (via the FTS voice radio). This process continues until the RCS operator guides the target to the scenario starting point.

Start the scenario. Press the <<SPACE>> bar to start the scenario. This causes the system to broadcast a start command to all stations. Coincident with the pressing of the space bar the RCS operator announces the start of scenario over the radio so that the DAS operators can inform the crews on the weapon systems.

NOTE

For PTS scenarios only.
While the scenario is running the RCS operator monitors the system to ensure proper operation.

For FTS and Mixed scenarios the RCS operator may need to use the PLS trackball and camera monitor to aid in the tracking of flying targets.

Wait for DAS. At the weapon system, the crews perform their engagement functions. When they are complete the DAS operator announces to the RCS that the DAS is finished with the scenario.

Stop the scenario. Press <<ESC>> to stop the scenario. This causes the system to broadcast a stop command to all stations.

Auto upload. The system automatically uploads the entered and collected data from each DAS. At the RCS upload and release window messages are displayed for each station (see Figure 58 and Figure 59).

SAIC(R) Range Target System v1.09 Thursday February 20, 1992 12:03 pm				
Range Control Station (RCS)				
Test	Calibrate	Realtime	Feedback	Offload
Scenario 22 Upload Data Acquisition Station #3				
Please Wait				

Figure 58. Scenario upload.

SAIC(R) Range Target System v1.09 Thursday February 20, 1992 12:04 pm				
Range Control Station (RCS)				
Test	Calibrate	Realtime	Feedback	Offload
Scenario 22 Release Popup Target #9				
Please Wait				

Figure 59. Scenario release.

Once all uploads are complete the RCS returns to the main menu. At this point the DAS operators can provide feedback to the weapon crews. When the DAS operators are finished they report back to the RCS that they are "Ready." This informs the RCS operator that each DAS is ready for the next scenario.

NOTE

Once all uploads are complete, the system returns the RCS to the main menu.
At this point the DAS operators can provide feedback to the weapon crews.
When the DAS operators are finished with Feedback they report back to the RCS that they are "Ready,"
this informs the RCS operator that the DAS operators are in the main menu and
they are ready for the next scenario.

Select "Feedback." Selection of this option will display the Feedback menu (see Figure 60). The Feedback menu has two options, Trial and Score.

SAIC(R) Range Target System v1.09		Thursday February 20, 1992 2:24 pm	
Range Control Station (RCS)			
Test	Calibrate	Realtime	Feedback
			Trial Score
Press [↑], [↓], [←] or [→] to move, [ENTER] to select, [ESC] to return			

Figure 60. Feedback menu.

Select "Trial." The "Trial" option is used to display performance data on scenarios. This is not the same as performance scoring feedback which provides average performance across scenarios of a given type and difficulty (see section on Post Processing Operations). Press <<ENTER>> to select Trial; the system will then prompt the operator for crew number (see Figure 61).

SAIC(R) Range Target System v1.09 Thursday February 20, 1992 2:28 pm Range Control Station (RCS)				
Test	Calibrate	Realtime	Feedback	Offload
			Trial Score	
Enter crew number:				
Press [ENTER] to continue, [ESC] to cancel				

Figure 61. Trial crew prompt.

Enter crew number. The crew number is a unique number assigned to a crew by the RTS software. Enter the number then press <<ENTER>> to accept. Once the crew number is entered, the Trial window is displayed momentarily, then a repetition prompt is displayed (see Figure 62 and Figure 63).

SAIC(R) Range Target System v1.09 Thursday February 20, 1992 2:26 pm Range Control Station (RCS)								
Test	Calibrate	Realtime	Feedback	Offload				
			Trial Score					
Enter scenario number:								
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <td style="padding: 5px;">Trial</td> <td></td> </tr> <tr> <td style="padding: 5px;">Crew</td> <td style="text-align: center; padding: 5px;">12</td> </tr> </table>					Trial		Crew	12
Trial								
Crew	12							
Press [ENTER] to continue, [ESC] to cancel								

Figure 62. Trial scenario prompt.

SAIC(R) Range Target System v1.09 Thursday February 20, 1992 2:27 pm							
Test Calibrate Realtime Feedback Offload Trial Score							
Enter repetition: <table border="1" style="margin: 0 auto; border-collapse: collapse;"> <tr> <th colspan="2" style="padding: 2px;">Trial</th> </tr> <tr> <td style="padding: 2px;">Crew</td> <td style="padding: 2px; text-align: right;">12</td> </tr> <tr> <td style="padding: 2px;">Scenario</td> <td style="padding: 2px; text-align: right;">17</td> </tr> </table> Press [ENTER] to continue, [ESC] to cancel		Trial		Crew	12	Scenario	17
Trial							
Crew	12						
Scenario	17						

Figure 63. Trial repetition prompt.

Enter repetition number. The repetition number is a sequence number assigned by the RTS software, it reflects the number of times a crew has been presented a scenario. Enter the number then press <<ENTER>> to accept. Once the repetition number is entered, feedback on each target presented (first, second, third, etc.) is displayed in the Feedback window (see Figure 64). Feedback on preceding or subsequent targets can be displayed by target worked (first to last) by use of the <<TAB>> key.

NOTE

Task event ranges that are negative in value indicate that the FTS target was egressing when the event occurred (i.e., positive ranges are associated with ingressing aircraft events).

SAIC(R) Range Target System v1.09 Thursday February 20, 1992 2:29 pm	
Popup Target #1	
Scenario	17
Repetition	0
TOT STD	None
Model	UN-1
IDCOR	Incorrect ID
Effect 1	NONE
Effect 2	NONE
Final Effect	NONE
Total Rounds	0

TPM	Time	Status	Criteria
AVL -> DET	4	No Criteria	N/A
DET -> ID	1	No Criteria	N/A
ID -> ENG	0	No Criteria	N/A

Press [F] to print screen, [ESC] to exit

Figure 64. Trial feedback screen.

Select "Score." The option is not implemented. Selection of this option will display the option not implemented message window (see Figure 65).

SAIC(R) Range Target System v1.09 Thursday February 20, 1992 2:30 pm Range Control Station (RCS)				
Test	Calibrate	Realtime	Feedback	Offload
			Trial Score	

This option has not been implemented
<Press ESCAPE to continue>

Press [i], [j], [k] or [l] to move, [ENTER] to select, [ESC] to return

Figure 65. Score option.

Select "Offload." Selection of this option will display the Offload Menu (see Figure 66). The Offload Menu has two options, Aggregated Weapon Station Data (AWSD) and Data Base Files (DBF). These options are not implemented (see Post Processing Operations to offload data). Selection of either option will display the option not implemented message window (see Figure 67 and Figure 68).

SAIC(R) Range Target System v1.09 Thursday February 20, 1992 2:31 pm Range Control Station (RCS)				
Test	Calibrate	Realtime	Feedback	Offload
				AWSD DBF

Press [i], [j], [k] or [l] to move, [ENTER] to select, [ESC] to return

Figure 66. Offload menu.

SAIC(R) Range Target System v1.09 Thursday February 20, 1992 2:36 pm Range Control Station (RCS)				
Test	Calibrate	Realtime	Feedback	Offload
				AWSO DBF
This option has not been implemented <Press ESCAPE to continue> Press [↑], [↓], [←] or [→] to move, [ENTER] to select, [ESC] to return				

Figure 67. AWSO option.

SAIC(R) Range Target System v1.09 Thursday February 20, 1992 2:36 pm Range Control Station (RCS)				
Test	Calibrate	Realtime	Feedback	Offload
				AWSO DBF
This option has not been implemented <Press ESCAPE to continue> Press [↑], [↓], [←] or [→] to move, [ENTER] to select, [ESC] to return				

Figure 68. DBF option.

Data Acquisition Station (DAS) Operations

The DAS software is started by typing "DAS" at the MS-DOS prompt. Once the software is running, the DAS Main Menu will appear (see Figure 69).

SAIC(R) Range Target System v1.09		Thursday February 20, 1992 2:47 pm	
Data Acquisition Station (DAS) #3		Squad Leader: 000000000	
AVENGER		Squad Gunner: 000000000	
Crew: 12			
Test	Calibrate	SSN	Feedback

Press [+], [↑], [-] or [↓] to move, [ENTER] to select, [ESC] to return

Figure 69. DAS main menu.

The following is a brief explanation about the DAS Main Menu options and the procedures needed to perform DAS operations.

PTS test. At the DAS with the system in the Main Menu, select the "Test" option (see Figure 70). The PTS test is normally performed at the RCS. Refer to the System Test and Calibration procedures for this test.

SAIC(R) Range Target System v1.09		Thursday February 20, 1992 2:51 pm	
Data Acquisition Station (DAS) #3		Squad Leader: 000000000	
AVENGER		Squad Gunner: 000000000	
Crew: 12			
Test	Calibrate	SSN	Feedback

PTS
AVENGER

Press [+], [↑], [-] or [↓] to move, [ENTER] to select, [ESC] to return

Figure 70. Test menu.

Weapon system test. Select the "Weapon" option (label equates to the weapon type you are connecting to [see Figure 71]).

NOTE

Ensure that the correct weapon type code has been entered before performing the test (refer to RTS setup if weapon label does not match weapon system).

Selection of this option results in the display of boxes corresponding to weapon events (see Figure 71).

SAIC(R) Range Target System v1.09		Monday February 24, 1992 10:46 am	
Data Acquisition Station (DAS) #3		Squad Leader: 000000000	
AVENGER		Squad Gunner: 000000000	

Test	Calibrate	SSN	Feedback
------	-----------	-----	----------

PTS	AVENGER Test							
AV	1 IFF	2 ACT	3 ---	4 UNC	5 ATK	6 FIR	7 TNG	8 ENG
	3.84 4.08	4.60 4.80	5.31 5.52	6.03 6.33	6.81 7.00	7.43 7.69	8.26 8.56	13.88 14.33

Press [SPACE] to toggle Channel S. [ESC] to exit

Figure 71. Weapon test.

NOTE

The weapon system should be connected to the DAS computer Weapon System Interface (WSI) connector (refer to chapter on System Preparation and Installation).

The gunner performs a normal engagement using the weapon system. As each weapon switch is activated and then deactivated, the DAS computer should display these events as a function of time (see Figure 71). This display provides the means for the operator to determine that the weapon events are being received at the DAS.

NOTE

The operator simply views the display while the gunner goes through the complete engagement process. If event entries are not displayed properly, restart the DAS computer and re-run this procedure. Call maintenance if problems in receiving weapon inputs continue.

SAIC(R) Range Target System v1.09		Thursday February 20, 1992 2:58 pm	
Data Acquisition Station (DAS) #3		Squad Leader: 000000000	
AVENGER		Squad Gunner: 000000000	
Crew: 12			

Test	Calibrate	SSW	Feedback
------	-----------	-----	----------

PTS

PTS
1
2
3
4
5
6
7
8
9

Press [↑] or [↓] to move, [ENTER] to select, [ESC] to return

Figure 73. PTS selection.

Select "Up." The operator must press the <<ENTER>> key immediately when the target first appears, thereby calibrating the "Unmasked" time. The operator again presses <<ENTER>> when the target is in its fully raised position, thereby calibrating the time for "Raised." Next the operator selects and enters "Down", and then presses <<ENTER>> when the target is no longer visible, thereby calibrating the time for "Masked." Each step is fully prompted and interactive (see Figures 74 through 78).

SAIC(R) Range Target System v1.09		Monday February 24, 1992 10:58 am	
Data Acquisition Station (DAS) #3		Squad Leader: 000000000	
AVENGER		Squad Gunner: 000000000	
Crew: 12			

Test	Calibrate	SSW	Feedback
------	-----------	-----	----------

PTS

PTS
1
2
3
4
5
6
7
8
9

PTS 9 Commands

Up (Raise target)
Reset
Status Request

Press [↑] or [↓] to move, [ENTER] to select, [ESC] to return

Figure 74. Up command.

SAIC(R) Range Target System v1.09		Monday February 24, 1992 10:56 am	
Data Acquisition Station (DAS) #3		Squad Leader: 000000000	
AVENGER		Squad Gunner: 000000000	
Crew: 12			

Test	Calibrate	SSN	Feedback
------	-----------	-----	----------

PTS

PTS

1
2
3
7
8
9

PTS 9 Commands

| Unmasked

| Abort

| Status Request

Press [↑] or [↓] to move, [ENTER] to select, [ESC] to return

Figure 75. Unmasked command.

SAIC(R) Range Target System v1.09		Monday February 24, 1992 10:56 am	
Data Acquisition Station (DAS) #3		Squad Leader: 000000000	
AVENGER		Squad Gunner: 000000000	
Crew: 12			

Test	Calibrate	SSN	Feedback
------	-----------	-----	----------

PTS

PTS

1
2
3
7
8
9

PTS 9 Commands

| Raised

| Abort

| Status Request

Press [↑] or [↓] to move, [ENTER] to select, [ESC] to return

Figure 76. Raised command.

SAIC(R) Range Target System v1.09		Monday February 24, 1992 10:56 am	
Data Acquisition Station (DAS) #3		Squad Leader: 000000000	
AVENGER		Squad Gunner: 000000000	
Crew: 12			

Test	Calibrate	SSN	Feedback
------	-----------	-----	----------

PTS

PTS

1
2
3
7
8
9

PTS 9 Commands

| Down (Lower target)

| Abort

| Status Request

Press [↑] or [↓] to move, [ENTER] to select, [ESC] to return

Figure 77. Down command.

SAIC(R) Range Target System v1.09 Monday February 24, 1993 10:57 am	
Data Acquisition Station (DAS) #3	Squad Leader: 000000000
AVENGER	Squad Gunner: 000000000
Crew: 12	

Test	Calibrate	SEN	Feedback
------	-----------	-----	----------

PTS
 1
2
3
7
8
9

PTS 9 Commands
 Masked
 Abort
 Status Request

Press [↑] or [↓] to move, [ENTER] to select, [ESC] to return

Figure 78. Masked command.

NOTE

The system automatically selects the options in order requiring the operator to press only the <<ENTER>> key to calibrate each function. Each time the process is repeated for a given target the computer will derive the average over all samples for each calibration event.

Select "Status." This option provides target information and status to be displayed on the right of the screen (see Figure 79).

SAIC(R) Range Target System v1.09 Monday February 24, 1993 10:57 am	
Data Acquisition Station (DAS) #3	Squad Leader: 000000000
AVENGER	Squad Gunner: 000000000
Crew: 12	

Test	Calibrate	SEN	Feedback
------	-----------	-----	----------

PTS
 1
2
3
7
8
9

PTS 9 Commands
 Up (Raise target)
 Reset
 Status Request

PTS 9 Status
 Target type: Unknown
 Orientation: 172°
 Pressure: OK
 Unmask Delay: 5 s
 Raise Delay: 10 s
 Mask Delay: 5 s

Press [ESC] to continue

Figure 79. Status.

Select "Abort." Select this option anytime during the calibration phase to abort the current calibration being performed.

Select "Reset." Select this option to return to the defaults associated with the selected target.

NOTE

The following procedure is conducted only once for each crew in their assigned roles (i.e., team chief and gunner).
Should they change roles then perform this procedure again.

The RTS system requires the crews to be identified to automatically assign and track crews.

Select "SSN." At the DAS with the system in the main menu, select SSN (see Figure 80). This option provides the means for the operator to identify the crew by their roles (i.e., squad leader and squad gunner).

SAIC(R) Range Target System v1.09		Thursday February 20, 1992 3:02 pm	
Data Acquisition Station (DAS) #3		Squad Leader: 000000000	
AVENGER		Squad Gunner: 000000000	
Crew: 12			
Test	Calibrate	SSN	Feedback
		Squad Leader	
		Squad Gunner	

Press [↑], [↓], [←] or [→] to move, [ENTER] to select, [ESC] to return

Figure 80. SSN menu.

Input SSN. The DAS operator selects the squad leader and gunner options, respectively (see Figure 81 and Figure 82), and will either enter or change the social security numbers to coincide with those of the current crew. To reenter numbers, simply backspace over those displayed and type in the new ones.

SAIC(R) Range Target System v1.09		Thursday February 20, 1992 3:03 pm	
Data Acquisition Station (DAS) #3		Squad Leader: 000000000	
AVENGER		Squad Gunner: 000000000	
Crew: 12			

Test	Calibrate	SSN	Feedback
------	-----------	-----	----------

Squad Leader
Squad Gunner

Enter squad leader SSN: 000000000

Press [ENTER] to continue, [ESC] to cancel

Figure 81. Squad leader SSN.

SAIC(R) Range Target System v1.09		Thursday February 20, 1992 3:03 pm	
Data Acquisition Station (DAS) #3		Squad Leader: 000000000	
AVENGER		Squad Gunner: 000000000	
Crew: 12			

Test	Calibrate	SSN	Feedback
------	-----------	-----	----------

Squad Leader
Squad Gunner

Enter gunner SSN: 000000000

Press [ENTER] to continue, [ESC] to cancel

Figure 82. Gunner SSN.

Accept SSN. Press <<ENTER>> to accept the SSNs once they are correct.

NOTE

The DAS must be in the main menu to run Realtime.
Failure to be in the main menu will result in the
DAS not running the selected scenario.

Realtime. Realtime is an option invoked by the RCS. Once the RCS operator has started realtime the DAS will receive a download from the RCS. During the download the DAS display will reflect that the DAS is in the Remote Mode (see Figure 83).

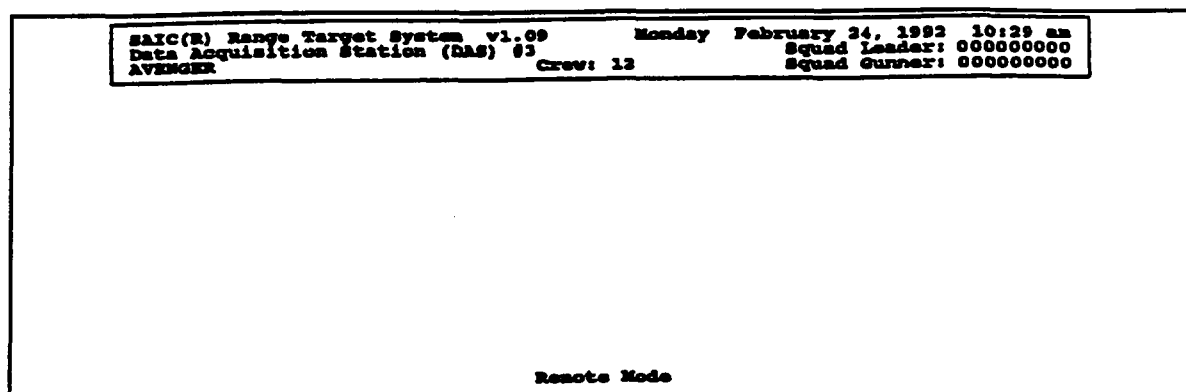


Figure 83. Remote mode.

Once the download is complete the DAS will wait for the start of scenario (see Figure 84).

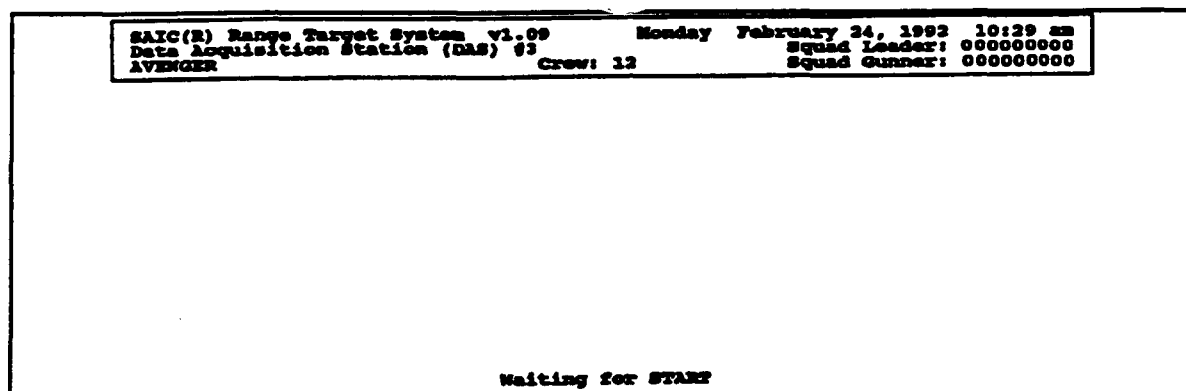


Figure 84. Waiting for start.

Alert the crew. After all downloads are complete, the RCS operator will start the scenario. Once the start is received by the DAS it starts realtime and displays a "Targets" window (showing the targets in the scenario with their corresponding function key), a "Squad Leader" window (showing Squad Leader events and their keys), and a "Squad Gunner" window (showing Squad Gunner events and their keys) (see Figure 85). The DAS operator announces the start of scenario by a voice alert (e.g., "RED TIGHT"). At this point the crew performs their target engagement functions. The DAS operator observes the crew to enter any events not automatically recorded.

SAIC(R) Range Target System v1.09 Monday February 24, 1993 10:30 AM Data Acquisition Station (DAS) 63 Squad Leader: 000000000 AVENGER Crew: 12 Squad Gunner: 000000000														
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><th style="text-align: left; padding: 2px;">Targets</th></tr> <tr><td style="padding: 2px;">PTS 9 [F9]</td></tr> <tr><td style="padding: 2px;">Deselect [ESC]</td></tr> </table>	Targets	PTS 9 [F9]	Deselect [ESC]	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><th style="text-align: left; padding: 2px;">Squad Leader</th></tr> <tr><td style="padding: 2px;">Detect [D]</td></tr> <tr><td style="padding: 2px;">Friendly ID [F]</td></tr> <tr><td style="padding: 2px;">Hostile ID [H]</td></tr> <tr><td style="padding: 2px;">Engage [E]</td></tr> <tr><td style="padding: 2px;">Cease fire [C]</td></tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><th style="text-align: left; padding: 2px;">Squad Gunner</th></tr> <tr><td style="padding: 2px;">Detect [ALT-D]</td></tr> <tr><td style="padding: 2px;">Friendly ID [ALT-F]</td></tr> <tr><td style="padding: 2px;">Hostile ID [ALT-H]</td></tr> </table>	Squad Leader	Detect [D]	Friendly ID [F]	Hostile ID [H]	Engage [E]	Cease fire [C]	Squad Gunner	Detect [ALT-D]	Friendly ID [ALT-F]	Hostile ID [ALT-H]
Targets														
PTS 9 [F9]														
Deselect [ESC]														
Squad Leader														
Detect [D]														
Friendly ID [F]														
Hostile ID [H]														
Engage [E]														
Cease fire [C]														
Squad Gunner														
Detect [ALT-D]														
Friendly ID [ALT-F]														
Hostile ID [ALT-H]														
REALTIME														

Figure 85. Realtime.

NOTE

The DAS operator is not required to designate the target in single target scenarios.

The system automatically designates the target in single target scenarios.

The DAS operator must be attentive during the scenario to ensure that the data is entered exactly when the crew performs the event.

Practice is required to ensure proper data entry.

Designate the target. When a target becomes available to the weapon crew a flashing arrow is displayed next to the target number in the Targets window (see Figure 86). When the crew first detects a target and announces "contact," the DAS operator must determine which target the crew is working (the crew points and voices the o'clock of the target at the target). The DAS operator designates the target by pressing the corresponding function key.

Targets are designated by the following keystrokes:

- <<1>> designates a flying target.
- <<F1>> designates the PTS at eleven o'clock far
- <<F2>> designates the PTS at twelve o'clock far
- <<F3>> designates the PTS at one o'clock far
- <<F7>> designates the PTS at eleven o'clock near
- <<F8>> designates the PTS at twelve o'clock near
- <<F9>> designates the PTS at one o'clock near

SAIC(R) Range Target System v1.09		Monday February 24, 1992 10:31 AM	
Data Acquisition Station (DAS) #3		Squad Leader: 000000000	
AVENGER		Squad Gunner: 000000000	
Crew: 12			

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: center;">Targets</th> </tr> <tr> <td style="padding: 2px;">•PTS 9</td> <td style="padding: 2px;">[F9]</td> </tr> <tr> <td style="padding: 2px;">•Deselect</td> <td style="padding: 2px;">[ESC]</td> </tr> </table>	Targets		•PTS 9	[F9]	•Deselect	[ESC]	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: center;">Squad Leader</th> </tr> <tr> <td style="padding: 2px;">Detect</td> <td style="padding: 2px;">[D]</td> </tr> <tr> <td style="padding: 2px;">Friendly ID</td> <td style="padding: 2px;">[F]</td> </tr> <tr> <td style="padding: 2px;">Hostile ID</td> <td style="padding: 2px;">[H]</td> </tr> <tr> <td style="padding: 2px;">Engage</td> <td style="padding: 2px;">[E]</td> </tr> <tr> <td style="padding: 2px;">Cease fire</td> <td style="padding: 2px;">[C]</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: center;">Squad Gunner</th> </tr> <tr> <td style="padding: 2px;">Detect</td> <td style="padding: 2px;">[ALT-D]</td> </tr> <tr> <td style="padding: 2px;">Friendly ID</td> <td style="padding: 2px;">[ALT-F]</td> </tr> <tr> <td style="padding: 2px;">Hostile ID</td> <td style="padding: 2px;">[ALT-H]</td> </tr> </table>	Squad Leader		Detect	[D]	Friendly ID	[F]	Hostile ID	[H]	Engage	[E]	Cease fire	[C]	Squad Gunner		Detect	[ALT-D]	Friendly ID	[ALT-F]	Hostile ID	[ALT-H]	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: center;">Popup Target #9</th> </tr> <tr> <td style="padding: 2px;">Detect</td> <td style="padding: 2px; text-align: right;">30.26</td> </tr> <tr> <td style="padding: 2px;">Hostile ID</td> <td style="padding: 2px; text-align: right;">34.42</td> </tr> <tr> <td style="padding: 2px;">Engage</td> <td style="padding: 2px; text-align: right;">35.82</td> </tr> <tr> <td style="padding: 2px;">Ordnance release</td> <td style="padding: 2px; text-align: right;">44.00</td> </tr> <tr> <td style="padding: 2px;">IFF</td> <td style="padding: 2px; text-align: right;">51.61</td> </tr> <tr> <td style="padding: 2px;">Activate</td> <td style="padding: 2px; text-align: right;">52.18</td> </tr> <tr> <td style="padding: 2px;">Acquire</td> <td style="padding: 2px; text-align: right;">52.88</td> </tr> <tr> <td style="padding: 2px;">Acquire</td> <td style="padding: 2px; text-align: right;">53.06</td> </tr> <tr> <td style="padding: 2px;">Lock-on</td> <td style="padding: 2px; text-align: right;">53.94</td> </tr> <tr> <td style="padding: 2px;">Auto-Track</td> <td style="padding: 2px; text-align: right;">54.85</td> </tr> <tr> <td style="padding: 2px;">Launch</td> <td style="padding: 2px; text-align: right;">55.87</td> </tr> <tr> <td style="padding: 2px;">Kill</td> <td style="padding: 2px; text-align: right;">63.01</td> </tr> </table>	Popup Target #9		Detect	30.26	Hostile ID	34.42	Engage	35.82	Ordnance release	44.00	IFF	51.61	Activate	52.18	Acquire	52.88	Acquire	53.06	Lock-on	53.94	Auto-Track	54.85	Launch	55.87	Kill	63.01
Targets																																																						
•PTS 9	[F9]																																																					
•Deselect	[ESC]																																																					
Squad Leader																																																						
Detect	[D]																																																					
Friendly ID	[F]																																																					
Hostile ID	[H]																																																					
Engage	[E]																																																					
Cease fire	[C]																																																					
Squad Gunner																																																						
Detect	[ALT-D]																																																					
Friendly ID	[ALT-F]																																																					
Hostile ID	[ALT-H]																																																					
Popup Target #9																																																						
Detect	30.26																																																					
Hostile ID	34.42																																																					
Engage	35.82																																																					
Ordnance release	44.00																																																					
IFF	51.61																																																					
Activate	52.18																																																					
Acquire	52.88																																																					
Acquire	53.06																																																					
Lock-on	53.94																																																					
Auto-Track	54.85																																																					
Launch	55.87																																																					
Kill	63.01																																																					

REALTIME

Figure 86. PTS data entry window.

SAIC(R) Range Target System v1.09		Monday February 24, 1992 10:36 AM	
Data Acquisition Station (DAS) #3		Squad Leader: 000000000	
AVENGER		Squad Gunner: 000000000	
Crew: 12			

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: center;">Targets</th> </tr> <tr> <td style="padding: 2px;">PTS 9</td> <td style="padding: 2px;">[F9]</td> </tr> <tr> <td style="padding: 2px;">•PTS 1</td> <td style="padding: 2px;">[1]</td> </tr> <tr> <td style="padding: 2px;">•Deselect</td> <td style="padding: 2px;">[ESC]</td> </tr> </table>	Targets		PTS 9	[F9]	•PTS 1	[1]	•Deselect	[ESC]	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: center;">Squad Leader</th> </tr> <tr> <td style="padding: 2px;">Detect</td> <td style="padding: 2px;">[D]</td> </tr> <tr> <td style="padding: 2px;">Friendly ID</td> <td style="padding: 2px;">[F]</td> </tr> <tr> <td style="padding: 2px;">Hostile ID</td> <td style="padding: 2px;">[H]</td> </tr> <tr> <td style="padding: 2px;">Engage</td> <td style="padding: 2px;">[E]</td> </tr> <tr> <td style="padding: 2px;">Cease fire</td> <td style="padding: 2px;">[C]</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: center;">Squad Gunner</th> </tr> <tr> <td style="padding: 2px;">Detect</td> <td style="padding: 2px;">[ALT-D]</td> </tr> <tr> <td style="padding: 2px;">Friendly ID</td> <td style="padding: 2px;">[ALT-F]</td> </tr> <tr> <td style="padding: 2px;">Hostile ID</td> <td style="padding: 2px;">[ALT-H]</td> </tr> </table>	Squad Leader		Detect	[D]	Friendly ID	[F]	Hostile ID	[H]	Engage	[E]	Cease fire	[C]	Squad Gunner		Detect	[ALT-D]	Friendly ID	[ALT-F]	Hostile ID	[ALT-H]	
Targets																														
PTS 9	[F9]																													
•PTS 1	[1]																													
•Deselect	[ESC]																													
Squad Leader																														
Detect	[D]																													
Friendly ID	[F]																													
Hostile ID	[H]																													
Engage	[E]																													
Cease fire	[C]																													
Squad Gunner																														
Detect	[ALT-D]																													
Friendly ID	[ALT-F]																													
Hostile ID	[ALT-H]																													

REALTIME

Figure 87. PTS and FTS realtime.

SAIC(R) Range Target System v1.09		Monday February 24, 1992 10:37 AM	
Data Acquisition Station (DAS) #3		Squad Leader: 000000000	
AVENGER		Squad Gunner: 000000000	
Crew: 12			

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: center;">Targets</th> </tr> <tr> <td style="padding: 2px;">•PTS 9</td> <td style="padding: 2px;">[F9]</td> </tr> <tr> <td style="padding: 2px;">•PTS 1</td> <td style="padding: 2px;">[1]</td> </tr> <tr> <td style="padding: 2px;">•Deselect</td> <td style="padding: 2px;">[ESC]</td> </tr> </table>	Targets		•PTS 9	[F9]	•PTS 1	[1]	•Deselect	[ESC]	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: center;">Squad Leader</th> </tr> <tr> <td style="padding: 2px;">Detect</td> <td style="padding: 2px;">[D]</td> </tr> <tr> <td style="padding: 2px;">Friendly ID</td> <td style="padding: 2px;">[F]</td> </tr> <tr> <td style="padding: 2px;">Hostile ID</td> <td style="padding: 2px;">[H]</td> </tr> <tr> <td style="padding: 2px;">Engage</td> <td style="padding: 2px;">[E]</td> </tr> <tr> <td style="padding: 2px;">Cease fire</td> <td style="padding: 2px;">[C]</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: center;">Squad Gunner</th> </tr> <tr> <td style="padding: 2px;">Detect</td> <td style="padding: 2px;">[ALT-D]</td> </tr> <tr> <td style="padding: 2px;">Friendly ID</td> <td style="padding: 2px;">[ALT-F]</td> </tr> <tr> <td style="padding: 2px;">Hostile ID</td> <td style="padding: 2px;">[ALT-H]</td> </tr> </table>	Squad Leader		Detect	[D]	Friendly ID	[F]	Hostile ID	[H]	Engage	[E]	Cease fire	[C]	Squad Gunner		Detect	[ALT-D]	Friendly ID	[ALT-F]	Hostile ID	[ALT-H]	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: center;">Flying Target #1</th> </tr> <tr> <td style="padding: 2px;">Detect</td> <td style="padding: 2px; text-align: right;">37.94</td> </tr> <tr> <td style="padding: 2px;">Hostile ID</td> <td style="padding: 2px; text-align: right;">40.74</td> </tr> <tr> <td style="padding: 2px;">Engage</td> <td style="padding: 2px; text-align: right;">41.24</td> </tr> <tr> <td style="padding: 2px;">IFF</td> <td style="padding: 2px; text-align: right;">44.85</td> </tr> <tr> <td style="padding: 2px;">Activate</td> <td style="padding: 2px; text-align: right;">48.84</td> </tr> <tr> <td style="padding: 2px;">Acquire</td> <td style="padding: 2px; text-align: right;">48.53</td> </tr> <tr> <td style="padding: 2px;">Acquire</td> <td style="padding: 2px; text-align: right;">48.73</td> </tr> <tr> <td style="padding: 2px;">Lock-on</td> <td style="padding: 2px; text-align: right;">47.89</td> </tr> <tr> <td style="padding: 2px;">Auto-Track</td> <td style="padding: 2px; text-align: right;">49.20</td> </tr> <tr> <td style="padding: 2px;">Launch</td> <td style="padding: 2px; text-align: right;">51.11</td> </tr> <tr> <td style="padding: 2px;">Miss: Out of range</td> <td style="padding: 2px; text-align: right;">63.11</td> </tr> </table>	Flying Target #1		Detect	37.94	Hostile ID	40.74	Engage	41.24	IFF	44.85	Activate	48.84	Acquire	48.53	Acquire	48.73	Lock-on	47.89	Auto-Track	49.20	Launch	51.11	Miss: Out of range	63.11
Targets																																																						
•PTS 9	[F9]																																																					
•PTS 1	[1]																																																					
•Deselect	[ESC]																																																					
Squad Leader																																																						
Detect	[D]																																																					
Friendly ID	[F]																																																					
Hostile ID	[H]																																																					
Engage	[E]																																																					
Cease fire	[C]																																																					
Squad Gunner																																																						
Detect	[ALT-D]																																																					
Friendly ID	[ALT-F]																																																					
Hostile ID	[ALT-H]																																																					
Flying Target #1																																																						
Detect	37.94																																																					
Hostile ID	40.74																																																					
Engage	41.24																																																					
IFF	44.85																																																					
Activate	48.84																																																					
Acquire	48.53																																																					
Acquire	48.73																																																					
Lock-on	47.89																																																					
Auto-Track	49.20																																																					
Launch	51.11																																																					
Miss: Out of range	63.11																																																					

REALTIME

Figure 88. FTS data entry window.

Enter events. After the target has been designated, the DAS operator immediately enters a <<D>> for Squad Leader detection or <<ALT-D>> for Squad Gunner detection.

When the crew makes their identification and announces hostile or friendly, the DAS operator enters the appropriate letter key: <<H>> for hostile and <<F>> for friendly if the Squad Leader makes the identification or <<ALT-H>> for hostile and <<ALT-F>> for friendly if the Squad Gunner makes the identification.

When the squad leader gives his command to "engage" or "cease engagement," the DAS operator enters the appropriate letter key: <<E>> for engage or <<C>> for cease engagement (see Figure 87).

NOTE

This process is repeated for all targets being worked in a multiple target scenario. The DAS operator must ensure that the target designated is the target being worked.
To designate additional targets in a scenario
the DAS operator presses the function key corresponding to the new target.

The DAS operator monitors the gunner events which are captured directly from the weapon system. Example: As the gunner acquires the target, for example, and acquisition tone is heard, the tabular display should show that acquisition has occurred. If any of the gunner events fail to be logged by the system, this should be reported immediately after the end of the scenario to the RCS operator (see Figure 88).

CAUTION

Failure to report missing events will result in missing data.
This will affect the crews' feedback and scoring.

Ensure that once the crew fires on the last target in a scenario you allow sufficient time for missile or round flyout. Failure to do so will result in loss of effects for that target.

Scenario complete. Once the crew has engaged all targets in a given scenario report to RCS that the scenario is complete.

NOTE

If the DAS operator wishes to provide the crew with feedback he or she must inform the RCS of your actions.
Once complete, remember to report "READY" to the RCS.

Feedback is provided on the last scenario run only.

Select feedback. At the DAS, with the system in the main menu, select Feedback (see Figure 89). This option is selected if the DAS operator wishes to review or provide to the crew with feedback.

SAIC(R) Range Target System v1.09		Thursday February 20, 1992 3:04 pm	
Data Acquisition Station (DAS) #3		Squad Leader: 000000000	
AVENGER		Squad Gunner: 000000000	
Crew: 12			

Test	Calibrate	SSN	Feedback
------	-----------	-----	----------

Trial

Press [↑], [↓], [←] or [→] to move, [ENTER] to select, [ESC] to return

Figure 89. Feedback menu.

NOTE

Negative task event ranges are associated with egressing FTS aircraft;
positive event ranges refer to ingressing targets).

Review feedback. Selection of this option results in the display of performance data along with the applicable standards for the level of difficulty of the scenario (see Figure 90).

SAIC(R) Range Target System v1.09		Monday February 24, 1992 1:23 pm	
Data Acquisition Station (DAS) #3		Squad Leader: 000000000	
AVENGER		Squad Gunner: 000000000	
Crew: 12			

Popup Target #9					
Scenario	22	TPN	Time	Status	Criteria
Repetition	3	AVL -> DET	4	No Criteria	N/A
TGT STD	None	DET -> ID	3	No Criteria	N/A
Model	MI-8	DET -> IFF	10	No Criteria	N/A
		ID -> ENG	3	No Criteria	N/A
		DET -> ACO	13	No Criteria	N/A
		ACO -> LOC	3	No Criteria	N/A
IDCOR	Correct ID	ACO -> ATK	3	No Criteria	N/A
		LOC -> FIR	3	No Criteria	N/A
Effect 1	KILL	DET -> FIR	10	No Criteria	N/A
Effect 2	NONE				
Final Effect	KILL				
Total Rounds	1				

Press [ESC] to exit

Figure 90. Feedback.

Multiple targets. If there were multiple targets, subsequent target feedback can be viewed by toggling forward or backward using the <<TAB>> keys.

Position-Location Station (PLS) Operations

Once the PLS is energized, the PLS Main Menu will appear (see Figure 91). The main menu can also be activated by typing "PLS" after the operating system prompt (C:\RTS with flashing "-" cursor). The option "TEST" will be highlighted initially, but any option can be selected by moving the highlighter with the arrow keys and pressing <<ENTER>> to accept. The "TEST" option has two suboptions: "TRACK" (PLS tracking test) and "ORIENT" (PLS orientation test) (see Figure 92).

SAIC(R) Range Target System v1.09		Friday February 21, 1992 2:41 am
Position Location Station (PLS) #1		
Test	Calibrate	

Press [↑], [↓], [←] or [→] to move, [ENTER] to select, [ESC] to return

Figure 91. PLS main menu.

SAIC(R) Range Target System v1.09		Friday February 21, 1992 2:42 am
Position Location Station (PLS) #1		
Test	Calibrate	
Track		
Orient		

Press [↑], [↓], [←] or [→] to move, [ENTER] to select, [ESC] to return

Figure 92. PLS test menu.



Ensure personnel are clear of the laser and camera area (top of Transport trailer).

Failure to do so may result in injury to personnel.

NOTE

Ensure that the laser is pointing at a retro-reflector to provide proper returns.

Select "Track." Selection of this option will activate the laser system and provide a "Target Tracking" screen (see Figure 93). This screen displays track data associated with the current orientation of the laser. The tracking display also provides labels that indicate tracking mode (i.e., automatic, semi-auto or manual) and laser status (i.e., on track, off track, or failed).

SAIC(R) Range Target System v1.09		Friday February 21, 1992 2:50 am																																	
Position Location Station (PLS) #1																																			
Test		Calibrate																																	
Track Orient																																			
<table border="1"><thead><tr><th colspan="4">Target Tracking</th></tr></thead><tbody><tr><td>Time:</td><td>434.56s</td><td></td><td></td></tr><tr><td>X:</td><td>122m</td><td></td><td></td></tr><tr><td>Y:</td><td>-1389m</td><td></td><td></td></tr><tr><td>Z:</td><td>949m</td><td></td><td></td></tr><tr><td>Range:</td><td>1662m</td><td></td><td></td></tr><tr><td>Azimuth:</td><td>174°</td><td>174.47°</td><td>-0.42°</td></tr><tr><td>Elevation:</td><td>35°</td><td>34.68°</td><td>-0.15°</td></tr></tbody></table>				Target Tracking				Time:	434.56s			X:	122m			Y:	-1389m			Z:	949m			Range:	1662m			Azimuth:	174°	174.47°	-0.42°	Elevation:	35°	34.68°	-0.15°
Target Tracking																																			
Time:	434.56s																																		
X:	122m																																		
Y:	-1389m																																		
Z:	949m																																		
Range:	1662m																																		
Azimuth:	174°	174.47°	-0.42°																																
Elevation:	35°	34.68°	-0.15°																																
Press [ESC] to exit																																			

Figure 93. Target tracking window.

If the laser loses track (i.e., the laser is not receiving the signal from the retro-reflector), the labels will switch to "Semi-Auto" mode and "Off Track" (see Figure 94). Loss of track will also cause the PLS to put out an audible tone (the operator can disable the tone by depressing the space bar on the PLS computer). In semi-automatic mode, the operator repositions the laser using the trackball until the target reappears in the camera display (described later in this section). This will result in the labels switching back to "Automatic" and "On Track." The audible tone at the PLS will turn off once track is re-established.

SAIC(R) Range Target System v1.09 Position Location Station (PLS) #1		Friday February 21, 1992 2:47 am																												
Test Calibrate																														
Track Orient																														
Target Tracking <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Time:</td> <td style="width: 30%;">273.16s</td> <td style="width: 10%;"></td> <td style="width: 30%;"></td> </tr> <tr> <td>X:</td> <td>132m</td> <td></td> <td></td> </tr> <tr> <td>Y:</td> <td>-1209m</td> <td></td> <td></td> </tr> <tr> <td>Z:</td> <td>850m</td> <td></td> <td></td> </tr> <tr> <td>Range:</td> <td>1484m</td> <td></td> <td></td> </tr> <tr> <td>Asimuth:</td> <td>173°</td> <td>175.62°</td> <td>0.68°</td> </tr> <tr> <td>Elevation:</td> <td>35°</td> <td>35.81°</td> <td>-0.29°</td> </tr> </table> SEMI-AUTO OFF TRACK			Time:	273.16s			X:	132m			Y:	-1209m			Z:	850m			Range:	1484m			Asimuth:	173°	175.62°	0.68°	Elevation:	35°	35.81°	-0.29°
Time:	273.16s																													
X:	132m																													
Y:	-1209m																													
Z:	850m																													
Range:	1484m																													
Asimuth:	173°	175.62°	0.68°																											
Elevation:	35°	35.81°	-0.29°																											
Press [ESC] to exit																														

Figure 94. Semi-auto and off track labels.

PLS tracking mode is controlled by operator use of the trackball (see Figure 95).

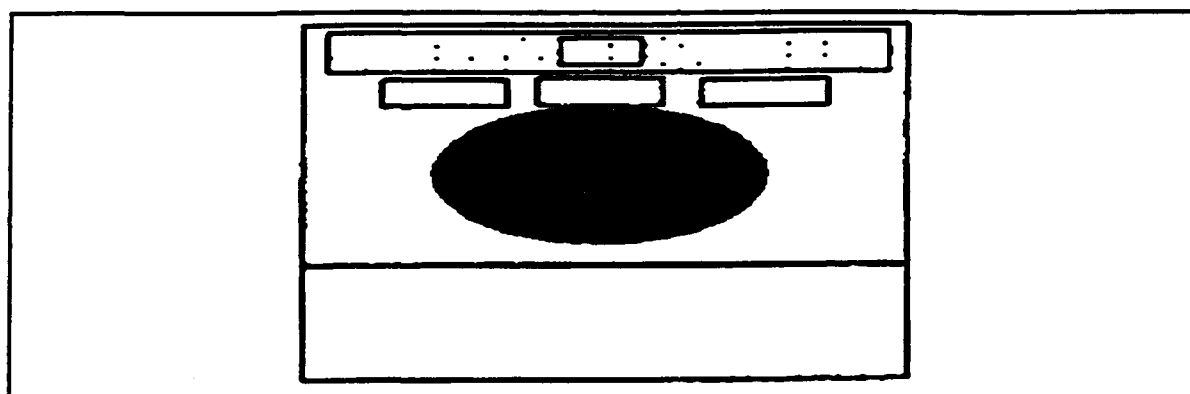


Figure 95. PLS trackball console.

To change tracking modes press the left button on the trackball while observing the tracking screen. The label should change between AUTOMATIC and MANUAL (see Figure 96 and Figure 97).

SAIC(R) Range Target System v1.09 Friday February 21, 1992 2:43 am																																	
Position Location Station (PLS) #1																																	
Test Calibrate																																	
Track Orient <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="4" style="text-align: center; padding: 2px;">Target Tracking</th> </tr> <tr> <td style="padding: 2px;">Time:</td> <td style="padding: 2px;">12.48s</td> <td style="padding: 2px;"></td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">X:</td> <td style="padding: 2px;">172m</td> <td style="padding: 2px;"></td> <td style="padding: 2px; text-align: center;">AUTOMATIC</td> </tr> <tr> <td style="padding: 2px;">Y:</td> <td style="padding: 2px;">-1691m</td> <td style="padding: 2px; text-align: center;">0</td> <td style="padding: 2px; text-align: center;">ON TRACK</td> </tr> <tr> <td style="padding: 2px;">Z:</td> <td style="padding: 2px;">1185m</td> <td style="padding: 2px;"></td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">Range:</td> <td style="padding: 2px;">2072m</td> <td style="padding: 2px;"></td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">Azimuth:</td> <td style="padding: 2px;">174°</td> <td style="padding: 2px;">174.47°</td> <td style="padding: 2px;">0.29°</td> </tr> <tr> <td style="padding: 2px;">Elevation:</td> <td style="padding: 2px;">35°</td> <td style="padding: 2px;">34.68°</td> <td style="padding: 2px;">-0.21°</td> </tr> </table>		Target Tracking				Time:	12.48s			X:	172m		AUTOMATIC	Y:	-1691m	0	ON TRACK	Z:	1185m			Range:	2072m			Azimuth:	174°	174.47°	0.29°	Elevation:	35°	34.68°	-0.21°
Target Tracking																																	
Time:	12.48s																																
X:	172m		AUTOMATIC																														
Y:	-1691m	0	ON TRACK																														
Z:	1185m																																
Range:	2072m																																
Azimuth:	174°	174.47°	0.29°																														
Elevation:	35°	34.68°	-0.21°																														
Press [ESC] to exit																																	

Figure 96. "Automatic" label.

SAIC(R) Range Target System v1.09 Friday February 21, 1992 2:46 am																																	
Position Location Station (PLS) #1																																	
Test Calibrate																																	
Track Orient <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="4" style="text-align: center; padding: 2px;">Target Tracking</th> </tr> <tr> <td style="padding: 2px;">Time:</td> <td style="padding: 2px;">137.88s</td> <td style="padding: 2px;"></td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">X:</td> <td style="padding: 2px;">120m</td> <td style="padding: 2px;"></td> <td style="padding: 2px; text-align: center;">MANUAL</td> </tr> <tr> <td style="padding: 2px;">Y:</td> <td style="padding: 2px;">-1488m</td> <td style="padding: 2px; text-align: center;">4</td> <td style="padding: 2px; text-align: center;">ON TRACK</td> </tr> <tr> <td style="padding: 2px;">Z:</td> <td style="padding: 2px;">1027m</td> <td style="padding: 2px;"></td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">Range:</td> <td style="padding: 2px;">1812m</td> <td style="padding: 2px;"></td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">Azimuth:</td> <td style="padding: 2px;">175°</td> <td style="padding: 2px;">175.62°</td> <td style="padding: 2px;">0.67°</td> </tr> <tr> <td style="padding: 2px;">Elevation:</td> <td style="padding: 2px;">35°</td> <td style="padding: 2px;">35.81°</td> <td style="padding: 2px;">0.81°</td> </tr> </table>		Target Tracking				Time:	137.88s			X:	120m		MANUAL	Y:	-1488m	4	ON TRACK	Z:	1027m			Range:	1812m			Azimuth:	175°	175.62°	0.67°	Elevation:	35°	35.81°	0.81°
Target Tracking																																	
Time:	137.88s																																
X:	120m		MANUAL																														
Y:	-1488m	4	ON TRACK																														
Z:	1027m																																
Range:	1812m																																
Azimuth:	175°	175.62°	0.67°																														
Elevation:	35°	35.81°	0.81°																														
Press [ESC] to exit																																	

Figure 97. "Manual" label.

To test laser tracking using the trackball, select "AUTOMATIC," then point the laser at a target (PTS) that has a retro-reflector mounted. Verify alignment by viewing the camera display screen.

If the laser is tracking the wrong target, switch to "MANUAL" mode by pressing the left button on the trackball (pressing the middle button will interrupt the laser transmission of the current track; pressing the right button will stop the laser's movement in azimuth and elevation). Reorient the laser with the trackball so that it is on the correct target and select "AUTOMATIC" by pressing the left button again. The coordinates of the selected target and the azimuth and elevation of the laser should be consistent with the values obtained during registration of that target.

The PLS should be tested to ensure that automatic tracking is operating. The primary method of test is to launch an fixed-wing target with retro-reflectors mounted and see if the laser system will track the target automatically. The secondary method is to position the spotter down range with the registration pole (retro-reflector mounted). Ensure you have good laser track in "MANUAL" then switch to "AUTOMATIC" (press the left button on the trackball), and have the spotter move from his present location to another. The spotter should keep the retro-reflector facing the laser at all times during this test. The laser should automatically follow the spotter. As long as the laser receives returns, the "On-Target" label is present. If the laser loses the target, the "Off-Target" label will appear and the system will go to semi-automatic mode.

The "SEMI-AUTOMATIC" mode allows the operator to realign the laser with the target. Periodically the laser may lose track of a maneuvering target. Using the trackball and camera the operator can adjust the azimuth and elevation of the laser to that of the target. "SEMI-AUTOMATIC" provides the means for the operator to regain track and continue operations.

In the event of a laser failure the label will switch to "FAILED" (see Figure 98).

SAIC(R) Range Target System v1.09		Friday February 21, 1992 2:44 am	
Position Location Station (PLS) #1			
Test		Calibrate	
Track			
Orient			

Target Tracking			
Time:	27.89s		
X:	101m		
Y:	-1826m	0	SEMI-AUTO
S:	1078m	FAILED	
Range:	1871m		
Asimuth:	176°	184.79°	-0.97°
Elevation:	35°	45.79°	0.18°

Press [ESC] to exit

Figure 98. Laser "Failed" label.

Select "orient." This option will prompt the operator for an orientation position number (see Figure 99). The orientation position number is typically associated with a launch and recovery area for flying targets.



Ensure all personnel are clear of the roof of the transport trailer.
Failure to do so may result in injury to personnel.

Press <<ENTER>> to accept position number. This will cause the laser to position to the desired location.

SAIC(R) Range Target System v1.09		Friday February 21, 1992 2:51 am
Position Location Station (PLS) #1		
Test	Calibrate	
Track Orient		
Enter launch position number: 1		
Press [ENTER] to continue, [ESC] to cancel		

Figure 99. Position prompt.

Status. This option displays the current azimuth and elevation of the laser on the right of the screen (see Figure 100).

SAIC(R) Range Target System v1.09		Friday February 21, 1992 2:53 am												
Position Location Station (PLS) #1														
Test	Calibrate													
Track Orient														
<table border="1"><thead><tr><th colspan="3">Orientation</th></tr><tr><th></th><th>Desired</th><th>Current</th></tr></thead><tbody><tr><td>Azimuth:</td><td>242°</td><td>174°</td></tr><tr><td>Elevation:</td><td>2°</td><td>35°</td></tr></tbody></table>			Orientation				Desired	Current	Azimuth:	242°	174°	Elevation:	2°	35°
Orientation														
	Desired	Current												
Azimuth:	242°	174°												
Elevation:	2°	35°												
Press [ESC] to exit														

Figure 100. Orientation window.

Select "Calibrate." This option is not implemented.

Laser Ballistics Simulator (LBS) Operations

The Laser Ballistics Simulator is a stand alone component of the RTS. It can be deployed independent of the DAS and RCS to provide gunner training. Refer to the manufacturers' documentation for operating procedures (see Maintenance and Supply, and Related User Documentation).

Pop-up Target System (PTS) Operations

The Pop-up Target Systems are stand alone components of the RTS. They can be deployed with the RCS to present pop-up target training or testing in isolation. Refer to the Range Target System (RTS) Operations Manual, Annex 1: Pop-up Target System (PTS) Operations and Maintenance Reference Manual for detailed instructions for operations.

Flying Target System (FTS) Operations

The Flying Target System is a stand alone component of the RTS. It can be deployed with the RCS and PLS to present flying target training or testing in isolation. Refer to the Range Target System (RTS) Operations Manual, Annex 2: Flying Target System (FTS) Operations and Maintenance Reference Manual for detailed instructions for operations.

Additionally, the FTS can be supplied as a service to RTS. This requires the use of contractors to provide the flying services needed for RTS operations.

Post-Processing Operations

Post-processing operations provide the means to perform the RTS software options not yet implemented (scoring and offload). This section provides the instructions to perform those operations.

The operations are stand-alone functions and can be run independent of each other. They are executed at the RCS from the operating system prompt (C:\RTS). To exit RTS perform the following procedures.

1. At the RCS with the system in the RTS Main Menu, press <<ESC>>. This will cause the system to prompt the operator to leave RTS.

2. Highlight the "Yes" option and press <<ENTER>>.

RTS software will terminate and return to the operating system prompt (C:\RTS).

Performance Scoring Reports. Performance scoring over several scenarios can be generated and printed at the RCS. To run scoring perform the follow procedures.

1. At the operating system prompt (C:\RTS) type "RTSCORE" then press <<ENTER>>.

2. Press <<ENTER>> again to clear the screen of the software copyright screen. The system will then prompt the user for the crew number(s) for which scoring is desired (see Figure 101).

ENTER TODAY'S STARTING CREW NUMBER-WITH LEADING ZEROES 0010
ENTER TODAY'S ENDING CREW NUMBER-WITH LEADING ZEROES 0010

Figure 101. Scoring crew numbers.

NOTE

When entering the crew numbers the user MUST use leading zeros (i.e., crew 10 would be entered 0010).

Scoring can be run on one crew or several crews.
The user has the option to enter one crew number as starting and ending crew numbers or a range of crew numbers.

3. Enter starting crew number. Then press <<ENTER>> to accept.

4. Enter ending crew number. Then press <<ENTER>> to accept.

Once the crew numbers are entered the system will automatically score the performance over all relevant scenarios, for both FTS and PTS scenario types, for each difficulty level, and for every crew requested, and generate a Scoring Report (see Figure 102). Scoring is usually performed at the end of a series of scenario test or training sessions but can be performed after each scenario run.

Offload. RTS software automatically uploads data from each DAS after each scenario. All performance data collected during the training or test session are subsequently stored on the hard disk in the RCS computer. This process makes the data retrievable for future reference. The procedure used to retrieve the data is called "OFFLOAD". Offload should be performed, at a minimum, at the close of each day of operation (training or test session). Because the "OFFLOAD" option on the RCS is not implemented from the main menu, a batch file is supplied. Follow these procedures to offload the data.

1. Place a formatted, blank floppy disk in drive "A" of the RCS computer and close the diskette drive latch.

2. At the prompt type "OFFLOAD." This will run a batch file that will copy the data to the floppy disk in drive "A".

The data files that should be copied to disk are:

AWSD.DBF	(data file)
CREWS.DBF	(crew numbers)
SCENHEAD.DBF	(scenario lookup file)
SCENPHTS.DBF	(PHT scenarios)
SCENFTS.DBF	(FTS scenarios)

Once the batch file has completed the copying of the data files, the system should return to the prompt (C:\RTS).

3. To ensure that all files have been copied to disk, type "DIR A:" then press <<ENTER>>.

This will display a directory of the floppy in drive "A". Check to see that all the above files are present and that the files reflect the proper time and date (when the copy was made). If there is a problem with the files repeat step 2 and 3. If all files are present and times and dates are correct, remove the floppy from drive "A" and return it to the analysis center for data reduction and statistical analyses.

STAND IN TARGET

DIFFICULTY-LOW

TASK PERFORMANCE MEASURES DIAGNOSTICS

TPM	MEAN	STATUS	CRITERIA
TIME OF DETECT	6.2	FAILS CRITERION	4
TIME OF ID	11.8	FAILS CRITERION	5
TIME OF IFF	4.7	FAILS CRITERION	4
TIME OF ENGAGE	0.4	MEETS CRITERION	1
TIME OF ACQUIRE	4.0	MEETS CRITERION	4
TIME OF LOCK-ON	4.0	FAILS CRITERION	2
TIME OF SUPER-ELEVATE	3.3	FAILS CRITERION	2
TIME OF FIRE	3.0	FAILS CRITERION	2
TOTAL TIME	14.3	FAILS CRITERION	8

PASS-FAIL DETERMINATION

SPM	SCORE	STATUS	CRITERIA
% DETECTED	83.3	FAILING	99
% IDENTIFIED	83.3	FAILING	99
% CORRECT ID	83.3	PASSING	80
% AC DESTROYED	66.7	FAILING	80
% HOSTILES ENG	100.0	PASSING	85
% FRIENDS CORR ID	50.0	FAILING	80
% HOSTILES CORR ID	100.0	PASSING	85
% ATTRITION	100.0	PASSING	65
% ORDNANCE RELEASED	25.0	FAILING	16

CREW: 7 11/28/89 2:32:31 WEAPON: STINGER
 SQUAD LEADER SSN -
 GUNNER SSN -

FIXED WING TARGET

DIFFICULTY-MEDIUM

TASK PERFORMANCE MEASURES DIAGNOSTICS

TPM	MEAN	STATUS	CRITERIA
RANGE OF DETECT	14073	MEETS CRITERION	11000
RANGE OF ID	7058	MEETS CRITERION	6000
RANGE OF IFF	12966	MEETS CRITERION	8000
RANGE OF ENGAGE	6936	MEETS CRITERION	5500
RANGE OF LOCK-ON	6558	MEETS CRITERION	5000
RANGE OF FIRE	5747	MEETS CRITERION	4000

PASS-FAIL DETERMINATION

SPM	SCORE	STATUS	CRITERIA
% DETECTED	100.0	PASSING	99
% IDENTIFIED	100.0	PASSING	99
% CORRECT ID	100.0	PASSING	75
% AC DESTROYED	100.0	PASSING	70
% HOSTILES ENG	100.0	PASSING	80
% HOSTILES CORR ID	100.0	PASSING	80
% ATTRITION	100.0	PASSING	60
% ORDNANCE RELEASED	0.0	PASSING	35

CREW: 7 11/28/89 12:32:03 WEAPON: STINGER
 SQUAD LEADER SSN -
 GUNNER SSN -

Figure 102. Scoring report.

Maintenance and Supply

Maintenance Support

RTS is a government owned, contractor operated and maintained system. The following describes the type of support available.

Local site representatives. Local Site Representatives are the primary source of assistance. They are knowledgeable about the configuration of the RTS, its applications, and special requirements of the user they serve. The Local Site Representatives are backed by Depot Representatives.

Depot representatives. Depot Representatives are highly trained, professional hardware and software maintenance support personnel. They provide backup maintenance and repair support to the Local Site Representatives.

Provisioning. RTS is designed to work with rather particular equipment; substitutions of recommended supplies and spares can affect the reliability, availability, and maintainability of the system. Refer to the various hardware manuals in the Reference Publication section for recommended supplies and spares. Some of the general supplies that should be obtained in sufficient quantities include printer paper and ribbons, PTS rotor blades, a variety of fuses, and a variety of batteries (for radios, PTS, FTS transmitters and receivers, etc.).

Related User Documentation

The "ADA Engagement Qualification Range Tables" document explains how to make use of the performance criteria and is included with the RTS. This manual is a reference guide to evaluating soldiers according to known standards of performance and focusing training where deficiencies exist.

There are also a number of reference manuals associated with the hardware and software components. These vendor manuals provide additional information on operations, preventive maintenance of the equipment, spares, and supplies. The list which follows includes important documentation that should be reviewed prior to attempting system operations.

The following lists all field manuals, technical manuals, and miscellaneous publications that are useful to operate RTS.

Field Manuals

Air Defense Artillery Employment for
Chaparral/Vulcan/Stinger

FM 44-3

Avenger Squad Operations FM 44-31

First Aid FM 21-11

FAAD/SHORAD Battery Operations
For Heavy Divisions FM 44-53

Technical Manuals

Cleaning Solvents and Compounds TM 9-247

Operator's Manual for Guided
Missile System, STINGER/IFF TM 9-1425-429-10

Operator's Manual for Guided Missile
Battery Control Central, Vehicle
Mounted AVENGER Air Defense
Weapon System TM 9-1425-433-10

Operator's Manual for CHAPARRAL
M48A2 Air Defense Guided
Missile System TM 9-1425-2586-10

Operator's Manual for GUN,
Air Defense Artillery,
TOWED 20-MM M167A2
(VULCAN, Basic and PIVADS) TM 9-1005-318-10

Operator's Manual for GUN,
Air Defense Artillery,
SELF-PROPELLED 20-MM M163A1
(VULCAN, Basic and PIVADS) TM 9-2350-300-10

Operator's and Organizational
Maintenance Manual,
Storage Batteries,
Lead-Acid Type TM 9-6140-200-14

Miscellaneous Publications (Hardware)

DataWorld Portacomp II 286 User's Guide

Onguard PC Series Uninterruptable Power System User's Manual

ESTeem Modem User's Manual

Okidata Microline 390 and 391 Printers Reference Guide

VideoTek Inc. Service Manual (color monitor)

Installation, Operation, and Maintenance Manual for 1830 and
1860 Series Environmental CCD NTSC Color Cameras

Installation and Operation Manual PT1250DC Heavy Duty Pan
Tilt

SAAB BT-53 Anti-Aircraft Missile Simulator Operator's and
Maintenance Manual

SAAB BT-53 Laser System Test and Calibration Procedures

Honda EX3300S/4500S Owner's Manual

PTS Operations and Maintenance Reference Manual

FTS Operations and Maintenance Reference Manual

Miscellaneous Publications (Software)

Dbase III

DB Files Reference Guide

DB2C Function Library

DT2811 Data Translation Reference Manual

DigiBoard Installation Guide Reference Manual

MicroSoft Library (several manuals)

MS/DOS Utilities

MS Assembler Reference Manual

Greenleaf Communications Library

"C" Worthy Interface Library

Polymake User's Manual

Programmer's PC Sourcebook

Miscellaneous References

Berry, M. G., & Barber, A. V. (1990). Range Target System (RTS) operations manual: Annex 1; Pop-up Target System (PTS) operations and maintenance reference manual (ARI Research Product 91-02). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences. AD A230096.

Berry, M.G., & Barber, A.V. (1990). Range Target System (RTS) operations manual: Annex 2; Flying Target System (FTS) operations and maintenance reference manual (ARI Research Product 91-03). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences. AD A229890.

Department of the Army Headquarters (1988). Standards in weapons training (TRADOC Pam 350-38). Washington, DC: Headquarters, Department of the Army.

Nomenclature Cross-Reference

The following is a list of common names for equipment referenced in this manual. The common name is used in this manual in lieu of nomenclature.

<u>COMMON NAME</u>	<u>NOMENCLATURE</u>
Camera	CCD NTSC Color Camera System
Computer	AT286 IBM Clone
Generator	Honda EX3300S Generator
Laser	SAAB BT-53 Laser System
LBS	SAAB BT-53 Anti-Aircraft Missile Simulator
Modem	Esteem RF Modem
Pan Tilt	PT1250DC Heavy Duty Pan Tilt
Printer	Okidata Microline 390 Printer
UPS	Onguard PC Series Uninterruptable Power Supply

References

- Barber, A. V. (1987). The Realistic Air Defense Engagement System (RADES): Three years of research results. El Paso, TX: Science Applications International Corporation.
- Drewfs, P. R., Barber, A. V., Johnson, D. M., & Frederickson, E. W. (1988). Validation of the Realistic Air Defense Engagement System (RADES) (ARI Technical Report 789). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences. AD A198289.
- Johnson, D., Barber, A. & Lockhart, J. (1988). The effect of target background and aspect angle on performance of Stinger teams in the Realistic Air Defense Engagement System (RADES) (ARI Technical Report 822). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences. AD A207283.

List of Abbreviations and Acronyms

The following is a list of the abbreviations and acronyms used in this manual. It is recommended that the users familiarize themselves with these terms.

ADA	Air Defense Artillery
ANT	Antenna
ARI	U.S. Army Research Institute for the Behavioral and Social Sciences
ASSY	Assembly
AUTO	Automatic
AWSD	Aggregated Weapon Station Data
AZ	Azimuth
BRT	Bright
CCW	Counterclockwise
CKT BKR	Circuit Breaker
COMM	Communications
CRT	Cathode Ray Tube
CW	Clockwise
DAS	Data Acquisition Station
DBF	Data Base Files
EL	Elevation
ESX	Engagement Simulation Exercise
FAAD	Forward Area Air Defense
FREQ	Frequency
FTS	Flying Target System
GFCI	Ground Fault Circuit Isolator
GND	Ground
GSE	Ground Support Equipment
IR	Infrared
KC/KHz	Kilocycle/Kilohertz
LBS	Laser Ballistics Simulator
LCD	Liquid Crystal Display

LFX	Live Fire Exercise
MAN	Manual
MANPADS	Man Portable Air Defense System
MC/MHz	Megacycle/Megahertz
NORM	Normal
OAC	Output Alternating Current
ODC	Output Direct Current
PHTS	Pop-up Target System (also known as PTS)
PIVADS	Product Improved Vulcan Air Defense System
PLS	Position-Location System
PMCS	Preventive Maintenance Checks and Services
PMS	Pedestal Mounted STINGER (Avenger)
PTL	Primary Target Line
PTS	Pop-up Target System (also known as PHTS)
PWR	Power
RADES	Realistic Air Defense Engagement Simulator
RCS	Range Control Station
REC	Receiver
REG	Registration Station (Virtual)
RF	Radio Frequency
R/T	Receiver-Transmitter
RTS	Range Target System
RX	Receive
SAIC	Science Applications International Corporation
SHORAD	Short Range Air Defense
SPKR	Speaker
SSN	Social Security Number
SW	Switch
TOE	Table of Organization and Equipment
TRANS	Transmitter
TX	Transmit
UPS	Uninterruptible Power Supply
VAC	Volts Alternating Current
VDC	Volts Direct Current
WSI	Weapon System Interface

Glossary

The following is a listing of definitions used throughout this manual. It is recommended that the users familiarize themselves with these terms.

Calibration

A procedure or group of procedures used throughout RTS to ensure system performance within specified parameters.

Coordinates

This refers to the position-location of system components in terms of a grid and associated "X" and "Y" coordinates. For example, the weapon (i.e., the DAS) is usually given the coordinates 0,0.

Crew number

A computer assigned number that is based on crew members social security numbers.

Data Acquisition Station (DAS)

The DAS captures weapon responses and provides the means for the operator to enter squad leader responses during system operations.

Download

A process that transfers data from the RCS to the PLS, each DAS and each PTS.

Engagement Simulation Exercise (ESX)

An exercise that simulates the firing of live ammunition.

Feedback

A menu option that provides task performance and engagement outcomes in terms of target range and elapsed time, e.g., detection, identification, and command to engage or cease fire. Feedback on the following gunner events is provided in terms of target range and elapsed time: acquisition interrogation, lock-on, super-elevation, fire, and reattack. Some of the above events are weapon-specific. The following collective summary feedback also is provided: identification accuracy, friendly and hostile aircraft engaged, engaged aircraft destroyed, friendly and hostile aircraft killed, and hostile aircraft releasing ordnance.

Flying Target System (FTS)

The FTS refers to flying targets and their associated equipment.

Highlighter

All interactive menus used in RTS make use of a highlighter. The highlighter appears as reverse video (i.e., a negative image with respect to the contrast of the rest of the display). The highlighter is used to aid the operator in the menu option selection process.

Instructor-Evaluator

This is the person in charge of the training and qualification of SHORAD and or FAAD personnel. Typically this individual is also a DAS operator, who performs data collection tasks and provides feedback to the exercising weapon crew.

Laser Ballistics Simulator (LBS)

The LBS is mounted on gun systems (i.e., Vulcan or PIVADS) to provide hit-miss engagement effects scoring, and to simulate tracer round fly-out to the engaged target.

Live Fire Exercise (LFX)

An exercise that involves the firing of live ammunition on a training range.

Menu

A computer generated screen that provides the means for operator interaction.

Pan-Tilt Assembly

A device used to position the laser and camera in elevation and azimuth.

Pop-up Target System (PTS)

The PTS is a trailer mounted pneumatic stand-lift mechanism that is remotely programmed via radio-frequency communications. The PTS provides the means to simulate a pop-up and hover maneuver.

Position Location Station (PLS)

The PLS provides the actual position of a flying target in terms of slant range from the weapon (in "X", "Y", and "Z" coordinates).

Primary Target Line (PTL)

This line equates to the 12 o'clock position, or directly down range, relative to the weapon crew. The PTL is the most likely avenue of approach for hostile aircraft and is generally at the center of the crew's search sector.

Range Control Station (RCS)

The RCS is the central control point for all RTS operations. The RCS is the station where system test and calibration checks, initialization of the system, realtime functions, performance scoring, and printing are initiated.

Realtime

The mode of operation that the RTS (all stations) are in when under scenario control.

Registration

Procedures used to position-locate system components in terms of "X", "Y" and "Z" coordinates.

Registration station (REG)

The REG is reference point for all components in RTS.

Release

A process that terminates an upload or download, conditioning the station for the next data transfer.

Remote mode

The mode of operation that the DAS and PLS switch to enabling the running of realtime.

Repetition number

A computer assigned number that corresponds to either the first, second, or nth time the scenario has been presented to a crew.

Retro-reflector

Devices that reflect the projected laser beams back to the laser receiver in order to derive the location coordinates of the object upon which the reflector is mounted (i.e., registration pole, DAS, PTS, or FTS).

RF modem

A device used to provide data communications via radio frequency.

RTS set up

A stand-alone software program that provides the means to generate RTS scenarios and configure and maintain RTS electronic system files.

Scenario

An electronic file that scripts by definition which targets will appear, where, when, for how long, at what orientation and range, in what sequence, etc. The scenario can also specify command and control conditions (e.g., alerting and cuing, weapons control status, interrogation response, etc.), difficulty level, terrain conditions, and so forth.

Scenario number

A number assigned to a scenario through the use of the RTSETUP program.

Scoring

A stand-alone software program that provides detailed crew performance scoring and feedback, which can be either scenario specific or averaged over several scenarios.

Spotter

This is the person used down range during registration of system components.

Test

A procedure or group of procedures used throughout RTS to ensure system performance and operability.

Uninterruptible Power Supply (UPS)

A device that protects electronic equipment and data from the harmful effects of blackouts, brown-outs, surges, sags, spikes, and transients (i.e., anomalies in the power flow). It also provides limited backup power during sustained low or no voltage.

Upload

A process that transfers data from each DAS to the RCS.

Weapon System Interface (WIS)

A device that interfaces the weapon to the DAS computer.